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THE METHOD

OF

THE RECITATION

BY

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Dedicated to

JOHN W. COOK

PRESIDENT OF THE NORTHERN ILLINOIS NORMAL SCHOOL

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PREFACE

The Method of the Recitation has sprung out of school-room work, and is designed to be a practical application of the principles of method to the various problems of class-room instruction. It is an effort to bring together and to organize the various principles that control skilful teaching.

It is based fundamentally upon the inductive-deductive thought movement in acquiring and using knowledge.

This organized plan of laying out recitation work was first projected by the thinkers of the Herbart school in Germany. For more than thirty years they have been developing and applying it under the title "The Formal Steps of Instruction" (*Die formalen Stufen des Unterrichts*). Formerly Dr. T. Ziller at Leipzig was a leader in the movement, and more recently Dr. W. Rein at Jena. They worked out their theory and applied it with proficiency to a large variety of topics in different studies, thus showing the flexibility of leading principles under various forms of application.

The Method of the Recitation is based upon the principles of teaching which were expounded and illustrated in the work of Herbart, Ziller, and Rein. At the same time, the authors hope to have shown in the body of the work that we have to do here with principles recognized by teachers in every land, and that there is no thoughtless imitation of foreign methods and devices. While our debt to German thinkers for an organization of fundamental ideas is great, the entire discussion, as here presented, springs out of American conditions; its illustrative materials are drawn exclusively from lessons commonly taught in our schools. In fact, the whole book, while strongly influenced by Herbart's principles, is the outgrowth of several years' continuous work with classes of children in all the grades of the common school.

The Method of the Recitation may be regarded as Part II of the broad subject of Method of which the "General Method," published earlier, is Part I. The latter book is a discussion of the leading principles of education as they bear on the school curriculum, and is designed to be preliminary to the definite treatment of recitation work.

The final test of the value of any such effort to organize the recitation must be found in the worth of the actual lessons worked out in accordance with its principles. Two chapters, II and XI, are given up to such typical lessons. Each topic or lesson unity treated requires several or even many recitation periods for its completion.

The authors have divided the work nearly equally between them, Chapters I, II, except the illustration "In unity is strength," Chapters IX, X, XI, and XIII, except the parable of the tares, being written by C. A. McMurry. Chapters III, IV, V, VI, VII, and VIII, Chapters XII and XIV by F. M. McMurry.

The present edition has been completely revised and supplied with marginal topics for better use as a text-book. Considerable additions have been made to the original edition and some changes made in the division and arrangement of chapters.

CONTENTS

METHOD OF RECITATION

CHAPTER I

VARIETY VERSUS UNIFORMITY IN METHODS OF INSTRUCTION

THERE has been a long-standing dispute among teachers whether or not the processes of instruction must conform to any fixed and uniform regulatives. Among scholars, and even among teachers, many have been sceptical of anything like a definite science of education.

Reasons for scepticism toward a science of education.

At the first glance, the broad field of education presents a medley, — many and varied studies, children of all ages and capacities, and teachers of nearly every quality and description. There are many sorts of schools, and great diversity of purpose and method even in schools of the same kind. In high schools, for example, there are general and business courses, classical and scientific courses, but teachers are at variance as to the best methods of instruction even in the classical course, to say nothing of the different standpoints of teachers of classics and of natural science. What is still more discouraging, the very sciences upon which pedagogy claims to be based, psychology and ethics, lie as much in the field of controversy as pedagogy itself. In the midst of this endless variety and fluctuation in the theory and practice of teaching, it is not strange that many educated people, even teachers, take a sceptical attitude toward scientific method, and regard each person as a law unto himself.

This tendency to discredit a science of education is indicated by our use of the term *method*. There is scarcely a more common word in the teaching profession, and it is frequently employed in the plural form, a practical admission not of one and only one right method, but that their number is legion. Also some of the most common watchwords of our profession point in the same direction, "Freedom and originality," "The teacher is born, not made," "Make your own method."

Our pedagogy seems to have fallen into a condition similar to that in which philosophy found itself in the time of the Sophists. Each man's judgment was counted as good as another's. Each man was the measure of all things, and though two men differed radically, both might be right in their judgments. The Sophists were sceptical of any universal standard of truth.

Universal principles of method the basis of a science of education.

But Socrates, who followed the Sophists, sought in the individual's thinking, when properly guided, a universal principle of truth, so that all men when they think logically and soundly must agree. He was in search of a uniform mode of thinking which would have universal validity. Pedagogy likewise is in search of universal principles of method in learning, based not upon the subjective whim of the teacher, but upon the common law of mental action which is universal with children and students, in fact with all human beings. And the extent to which such universal principles of method are discovered, determines the extent to which there is a science of education.

The question is this: Is there any essential, natural process upon which a uniform method of treating the varied school subjects can be based? As already said, to outward appearance there seems to be no such process; there seem to be no principles that may serve as a guide for all persons in teaching all subjects. But we should not be discouraged by appearances. The fact that even good teachers show an infinite variety of individual and personal traits, and that studies differ greatly in subject-matter, is no proof that there is not a common mode of procedure for instruction. We remember that everywhere in nature and in society is variety and apparent confusion; fundamental laws do not stand out so as to be easily detected by careless observers. They lie deep and must be searched out by patient examination and labor. In the study of trees and flowers no scientist is deceived by the multiplicity and variety of forms. It is the habit of his mind to reduce all varieties to common structural forms and simple classes.

Hence, while there is a large element in teaching that is always variable, according to the branch of study and the differing personality of teacher or pupils, may there not be essential uniformity; some great underlying principles of method?

Economy of such principles.

Could these principles be discovered, no one would deny their value; we are not so enamoured of individual freedom as to refuse submission to rational, regulated processes.

Definite and valuable principles of action, while they check one's freedom along foolish lines, guide effort into the channels of efficiency. Too much freedom becomes positively oppressive. Whether travelling over a continent or through a field of thought, erecting a mansion, or developing a high moral character, whoever would keep his bearings and work forward to an important end, must have a guide. Whether it be a compass, a model, or an ideal, he must look to it continually for direction. Any one engaged in a work so important and difficult as teaching is much in need of fixed principles which outline for him the ideal of method. If convinced that no one method is right, that no ideal can be set up, he is like a sea captain who is persuaded that whatever course he may choose for his vessel is at least possibly good. He acknowledges the possession of no standard of excellence, and sees chiefly fog in his chosen course. He is subject, therefore, to half-hearted action, for energy and encouragement are not born of uncertainty and confusion.

No one, therefore, will object to a search for the unity that may underlie the variety of good methods in teaching.

The uniformity of method in text-books.

Our text-books supply us with a definite formulation of methods of teaching. They are generally constructed out of the experience of the better teachers and in conformity with those traditional ideas and practices which are common to the great body of instructors. The examination and comparison of our most widely used text-books in grammar, arithmetic, history, geography, reading, etc., will show a uniformity in at least one very important respect.

It may be said that our text-books in *English grammar* are built on a single plan. As surely as an ordinary dwelling has parlor, sitting room, and kitchen, so grammar has orthography, etymology, and syntax. This is one kind of uniformity; namely, that of leading topics in the subject-matter. But, what is more to our purpose, the general truths contained in these materials are singled out as the central aim of study. In grammar everything culminates in the definitions and rules, whose complete mastery gives us the scientific grasp of the structure and meaning of language. In most books even the method of reaching the rules and definitions is stereotyped. Definitions, examples, and applications constitute the regular order in the treatment of every topic. Green's grammar is an illustration. Some of the more recent books have modified the order of topics and have adopted an inductive method of treatment; but under all changes the definitions and principles expressing the functions of the parts of speech and the syntactical relations of the elements of the sentence have remained the central aim of instruction.

An examination of a score of the best *arithmetics* in use will show a striking uniformity in the series of important topics treated. The following series is very familiar: the four fundamental operations, factoring, common fractions, decimals, compound numbers, percentage, ratio, proportion, involution, and evolution. But this external uniformity of subject-matter is only a sign of that deeper-lying uniformity which aims at the development and use of fundamental principles. The elementary general truths of arithmetic lie at the basis of all the important topics handled. The solution, analysis, and explanation of problems are simply means for bringing the important principles clearly to light. When the principles can be explicitly stated and intelligently applied, the essential aim of arithmetic has been reached. In most books even the method of procedure in mastering the rule is the same, first one or two simple problems worked out and explained, then the rule, followed by a series of applications growing more complex and difficult.

In algebra and geometry the essential principles which constitute the framework of these studies are still more strikingly prominent as the aim of study. While the methods of approach to principles vary somewhat, the definitions, theorems, and propositions, when finally reached, are formulated in nearly the same language.

In mathematics, therefore, as in grammar, instruction centres in the principles to be understood and applied. All variations in method, whether inductive or deductive, are different modes of presenting these generalizations.

A comparative study of the leading common-school *geographies* will show a similar agreement in aim. No study is richer in the abundance and variety of concrete material than geography, but the books follow a strong traditional tendency and are really modelled on a single plan. Not only the outline of leading topics is the same, such as mathematical geography, physical features of the continents, the political divisions and populations, the chief occupations, as agriculture, commerce, mining, and manufacturing, but in these topics the chief purpose is to give a distinct emphasis to the general truths which underlie all the variety of geographical detail.

Some of these truths, for example, are the following: soil comes from rock; slopes are necessary for drainage, and drainage for farming; mountains greatly influence temperature and rainfall; the roads of a country are an index of its civilization; great cities owe their growth largely to the advantages of their location for transportation; coal and iron ore are the two most important mineral products; climate and occupation greatly affect the character of a people. The location of points, the fixing of boundaries, etc., are of use, to be sure, but interest in geography centres primarily in such truths as these.

In *history* every important event is typical or representative in character, setting forth a truth common to many other events, or reappearing in the lives of many persons. In Hamilton's life and thinking as a statesman the notion of a strong central power of government was potent. This idea appears, also, in other statesmen, as in Webster, Washington, and Lincoln, and has gradually become an idea common to all patriotic Americans. The building of the old national road was a particular event, but it illustrated the principle of the right of the federal government under the constitution to make internal improvements. So every event in history, that is worth learning, helps point the way to a more general truth. History, therefore, has a large number of general truths in store, and it is the deeper, broader meaning of these general ideas which we seek, through particular events, to disclose.

This statement may be accepted without committing one's self in favor of a philosophy of history, such as that presented in Hegel's noted work bearing that title. One may properly believe that sufficient data for the broadest, deepest truths concerning human progress are wanting, so that history cannot reveal such truths, even to advanced students; but one may still feel convinced that it is the purpose of history to present general truths of a lower order, as those just suggested.

Beginning *reading* is a study in which the mastery and use of arbitrary symbols play a very important part; yet there is a small nucleus of generalization upon which the study is organized. In good reading final consonants are enunciated with distinctness; soft tones are heard; and the voice is modulated in accordance with the thoughts expressed. It is such abstract statements as these that the learner must comprehend and apply before he can read well.

Finally, even *spelling* contains its rules. But these, you say, are partly useless because of their numerous exceptions. True; and that is one of the reasons why spelling fails to receive the respect accorded to other studies. Its want of reliable rules deprives it of scientific content, and it is regarded by many persons as an evil, though a very necessary one. It is not a full study.

In these various studies, therefore, we find the tendency predominant to concentrate effort upon the mastery of essential general truths. What is the reason for such uniformity? Is it simply blind custom, or have we been working out, consciously or unconsciously, a fundamental principle in education? Is it not the latter? Whether conscious of it or not, text-book makers have been laboring for the nearest approach to a scientific statement and arrangement of general truths that each of the studies would permit. And while there has been much glib talk about freedom and originality in teaching, the text-books have held the great majority of teachers in a well-defined routine; have led them to do practically the same things, and in essentially the same way.

The striking similarity that marks each large class of text-books is one of the most noticeable characteristics of our education, and is in clear contrast to that variety of methods discussed at the beginning of this chapter. Education gravitates into these channels of generalized knowledge as surely as rivers work their way through the lowlands. Even in a democratic country where each community is free to adopt its own system and method of education, where no hierarchy of learned men in any way officially directs the educational policy, we see an almost universal tendency toward uniformity, based upon the broad scientific principles of any study.

General truths the starting-point for a scientific method of instruction.

If now we find that the ground for this uniformity is really a scientific idea, not only widely recognized, but valid in psychology, we may fix a starting-point for a sound pedagogy. The mastery of the general truths of a study must remain the direct purpose of instruction in each branch of knowledge. These truths are what are known in psychology as general notions or concepts. They are the centres around which the knowledge of any subject is grouped and classified. It is the mastery of these rules and principles, and the ability to apply them, that are constantly aimed at in all the best school work. From an examination of the psychologies we detect that the treatment of the precept and the concept (the particular and the general notion) furnishes two leading chapters of mental science. The process of learning as explained by all the psychologies culminates in the general notion or concept. Psychology supplies, therefore, a strong support to our conclusion as to the basis of scientific method.

It would not be difficult to show that all the higher studies, as history, science, language, medicine, law, etc., become organized under general notions or principles; in fact, the definition of science is "generalized, classified knowledge."

In the history of philosophy also the general notion plays a rôle not less important than in these other subjects. From the days of Socrates and Plato on, inductive and deductive reasoning have set the general notion as the centre of all thinking — as the thing aimed at in induction, and as the basis of all true deduction. When Herbert Spencer, therefore, calls his most fundamental book "First Principles," he has in mind those general truths which lie at the basis of his entire system of thought.

In conclusion, we find that the general notion is a pivotal centre of discussion not only in elementary and higher studies of all sorts, but also in the great fields of psychology and philosophy.

It is not claimed that the method by which general notions have been worked out in our text-books is uniformly correct and valid. This is a question that we are not called upon to settle at this point. Whether or not an inductive or deductive approach to general truths is the correct one, we can leave for further consideration. But one leading aim of instruction in every important study is a mastery, in the full sense, of its general truths. Without this basis no method of instruction has any validity. It may be that the method by which this aim can be best realized has been so thoroughly misinterpreted and misapplied that we have approached a uniformity of error in our methods of teaching. It may be that definitions and abstract formulæ have been set too much in the forefront of every lesson, and also that systematically formulated knowledge has been forced prematurely into lower grades. Yet it is a great step in the right direction to have fixed clearly the aim of instruction, to have determined the goal toward which all proper mental movement tends. Assuming that our conclusions thus far are justified, we may move on to a discussion of the essential steps in a correct method of instruction.

CHAPTER II

ILLUSTRATIVE LESSONS SHOWING THE PROCESSES OF REACHING GENERAL TRUTHS

In the first chapter, having located the goal of instruction in general notions and in their proper use, the question, how to reach them, now becomes paramount. In the present chapter a number of lessons is worked out to illustrate the different processes in vogue for mastering general truths. In each example two different methods are presented: first, that common to many of our text-books and to the usual practice of teachers; and second, the fuller inductive and developing method now followed in some schools.

The purpose of this chapter is not only to show the two ways of reaching a comprehension of such truths, but also to suggest other important phases of recitation work. In the discussions of recitation method which follow, these lessons may be kept in mind as illustrating the principles under treatment.

The lessons are taken from different studies, — arithmetic, geography, literature, natural science, and history. They recognize generalizations as the goal of instruction, but leave open the question as to whether or not any further principles of method may be found in the treatment of these various materials.

The Addition of Fractions

In first learning to add fractions, one method of the arithmetics is fairly illustrated by the following: —

What is the sum of $\frac{9}{23}$, $\frac{16}{23}$, and $\frac{10}{23}$?

Process: $\frac{9}{23} + \frac{16}{23} + \frac{10}{23} = \frac{9+16+10}{23} = \frac{35}{23} = 1\frac{12}{23}$.

What is the sum of $\frac{11}{18}$, $\frac{13}{18}$, $\frac{17}{18}$, and $\frac{7}{18}$?

What is the sum of $\frac{5}{8}$, $\frac{7}{12}$, and $\frac{11}{16}$?

Process:

$\frac{5}{8} + \frac{7}{12} + \frac{11}{16} = ?$

$\frac{30}{48} + \frac{28}{48} + \frac{33}{48} = \frac{91}{48} = 1\frac{43}{48}$.

Since unlike fractional units cannot be added, reduce the fractions $\frac{5}{8}$, $\frac{7}{12}$, and $\frac{11}{16}$, to a common denominator and then add the resulting fractions.

After ten or a dozen problems the following rule is given: —

"To add fractions, reduce the fractions to a common denominator, add the numerators of the new fractions, and under the sum write the common denominator."

The following more detailed process is suggested for consideration: —

How shall we add fractions whose denominators are unlike?

What fractions have you already learned to add? Try these, $\frac{1}{3}$ and $\frac{2}{3}$. $\frac{3}{5}$ and $\frac{2}{5}$. $\frac{7}{23}$ and $\frac{18}{23}$. Can you add $\frac{1}{4}$ and $\frac{1}{8}$? What change is necessary before adding them? Why not add them in the same way as the others? How can you add one bushel and one peck? Change the bushel to pecks. Add two yards and one foot. What change was necessary in both examples?

Add $\frac{1}{4}$ and $\frac{1}{8}$. $\frac{1}{4}=\frac{2}{8}$. $\frac{2}{8}+\frac{1}{8}=\frac{3}{8}$. Illustrate this with a square divided into fourths and eighths. Add $\frac{2}{5}$ and $\frac{4}{15}$. Add $\frac{1}{2}$ and $\frac{3}{4}$. What was done in all these cases before adding? How shall we add $\frac{1}{3}$ and $\frac{1}{4}$? How can you change the two fractions so that they will be alike, that is, have the same fractional unit? Change them to twelfths. One-third equals how many twelfths? One-fourth equals how many twelfths? $\frac{1}{3}+\frac{1}{4}=\frac{4}{12}+\frac{3}{12}=\frac{7}{12}$. Illustrate this with a sheet of paper folded into thirds, fourths, and twelfths.

Add $\frac{2}{5}$ and $\frac{1}{2}$. What is the common fractional unit?

It is $\frac{1}{10}$. $\frac{2}{5}+\frac{1}{2}=\frac{4}{10}+\frac{5}{10}=\frac{9}{10}$.

$\frac{3}{4}$ and $\frac{3}{10}=$? $\frac{3}{4}+\frac{3}{10}=\frac{15}{20}+\frac{6}{20}=\frac{21}{20}=1\frac{1}{20}$.

Notice, now, what was done in each of these problems: $\frac{1}{3}+\frac{1}{4}$, $\frac{2}{5}+\frac{1}{2}$, and $\frac{3}{4}+\frac{3}{10}$. The fractions in the first were changed to twelfths, in the second to tenths, and in the third to twentieths. Was the value of the fractions changed? But in each example the fractions were changed to a common fractional unit, or a common denominator. What was done to the numerators? In each fraction they were changed to correspond with the change in the denominator. Then, in adding, the numerators were added.

Make a rule for adding fractions that will cover all the cases so far worked: —

"To add these fractions, change the fractions to equivalent fractions having a common denominator. Add the numerators for a new numerator and use the common denominator for the new denominator."

To acquire skill and accuracy in this kind of addition: —

1. Add oral problems as follows: —

$$\frac{1}{5}+\frac{1}{3}. \quad \frac{7}{8}+\frac{3}{4}. \quad \frac{9}{12}+\frac{5}{8}. \quad \frac{4}{5}+\frac{7}{12}.$$

2. For written work add such as these: —

$$\frac{13}{18}+\frac{15}{27}+\frac{2}{3}=? \quad \frac{9}{10}+\frac{7}{15}+\frac{17}{20}=?$$

3. Add mixed numbers as follows: —

$$32\tfrac{5}{6}+17\tfrac{9}{10}+18\tfrac{3}{16}=?$$

Trade Centre in the Northwest — Minneapolis as a Type

This topic may be treated in two ways, briefly, as in the geographies, or in a fuller inductive manner. One of our grammar school geographies says: —

"Minneapolis, which adjoins St. Paul, so that the two are called the 'Twin Cities,' manufactures more flour than any other city in the world, its capacity being 40,000 barrels a day. The two cities have had a remarkably rapid growth."

Tilden's "Commercial Geography," which is very much fuller on this topic than the regular geographies, says: —

"Minneapolis, on the Mississippi at the Falls of St. Anthony, is the greatest flour-milling city in the world, and one of the greatest lumber markets and lumber-manufacturing centres in America. The yearly output of the flour mills is nearly 10,000,000 barrels. Of this about one-third is shipped to foreign countries, constituting about one-fourth of the total flour export of the United States. In manufacturing this flour the Minneapolis mills grind about 45,000,000 bushels of wheat annually. The Pillsbury 'A' mill is the largest flour mill in the world, having a daily capacity of 7500 barrels. The saw and planing mills of Minneapolis have an annual output of the value of $10,000,000, and the lumber is manufactured into barrels, boxes, cars, wagons, and many other products, aggregating a value twice as great. In the decade 1880–1890 the population of Minneapolis increased nearly fourfold."

The following is a much fuller treatment of Minneapolis in its important relations to the Northwest, such as would require several recitations:—

Minneapolis

We will inquire into the causes which make Minneapolis an important city.

Where is it and what have you heard about it? Why is it sometimes called the flour city? What is meant by the "Twin Cities"? Recall Hennepin's trip on the upper Mississippi and what you know of the Falls of St. Anthony. Can you tell something of the wheat fields and pineries of Minnesota?

St. Paul was an important trading-point and the capital of the state before Minneapolis had a beginning. Why should Minneapolis spring up only ten miles away and soon become larger even than St. Paul? The great water-power of the Falls is the first answer. How can water from a river be used to run a mill? Where have you seen a mill run by water-power? Describe the water-wheel, the dam, and mill-race. At Minneapolis the water is carried by a channel on the west side of the falls under the great mills where it drops forty feet to the large turbine wheels at the bottom, turning them and with them all the machinery of the mills.

Lumber. Along the upper Mississippi and its branches in northern Minnesota are large pine forests. How could the pine logs be brought to the sawmills at Minneapolis? Some of the early settlers moved northward into the pineries, cut down the trees in winter and sent them floating down the streams to the sawmills at Minneapolis. Soon large lumber companies were formed with big sawmills at the Falls, and owning extensive pine lands in the North. In the winter time they sent scores of men to the logging camps to get out the logs and float them down in springtime to the mills. With the mills at Minneapolis came the families of the mill companies and of the workmen, and thus a flourishing town sprang up at the Falls. Great lumber yards with their stacks of boards stretched along the river.

Some of this lumber would be used in building up Minneapolis, but where would most of it be sent?

The farmers were rapidly settling up the prairie regions of the Northwest. Locate these prairies on the map. In what directions from Minneapolis would most of the lumber be sent? For two or three hundred miles to the west, southwest, and northwest from Minneapolis the whole prairie land was rapidly taken by settlers. How could this lumber be gotten best to the new farms and villages? At first wagons were used, but soon railroads were built across the prairies, from St. Paul and Minneapolis, and car-loads of lumber were sent out to the towns and distributed by merchants to the farmers. As the lumber business grew the whole upper Mississippi with its tributaries became a network of streams and logging camps, collecting logs for the mills at Minneapolis. Closely connected with the sawmills were the planing mills for preparing dressed lumber, sash, doors, moulding, etc. Factories were also built for the manufacture of furniture, barrels, wagons, and agricultural implements. All these products were distributed by the railroads over the broad prairie regions of southern and western Minnesota, Iowa, the Dakotas, and Nebraska. In short, Minneapolis, by reason of its favorable position on the river and its water-power, soon became the chief centre of the lumber business of the Northwest, collecting logs from the pine lands of the North, working them up into lumber, furniture, etc., and distributing them to the broad area of prairie states.

How would the prairie farmer pay for the lumber

Wheat and flour.

and other goods coming from St. Paul and Minneapolis? What is the leading crop of the Northwest? It was soon found that the prairies were well adapted to the growth of wheat and other small grains. In a few years the prairies, with the rich valley of the Red River of the North, became one of the largest wheat-producing districts in the world. How would the farmers get their wheat and other grains to Minneapolis? The water-power at the Falls was soon found to be more valuable for flour mills than for sawmills. In the lumber mills the sawdust supplied abundance of fuel for the furnaces, so that they did not need the water-power, and hence the latter was used for running the great flour mills that were now built at the Falls. The same railroads which distributed lumber to the prairies collected the wheat. In 1871 only two car-loads of wheat were received in Minneapolis. In 1887 the Great Western road alone brought 33,000,000 bushels of wheat to the elevators at Minneapolis. In 1896 250,000 barrels of flour were ground here in a single week. In what directions would this immense quantity of flour be shipped and marketed? What lake ports would receive much of it for shipment by water? Notice on a railroad map the important railroad lines from the Twin Cities to Duluth, Milwaukee, and especially to Chicago. Much of this flour is shipped to Illinois, Ohio, etc., much to Pennsylvania, New York, and New England, and whole cargoes to Liverpool and Hamburg.

Minneapolis has become a centre for the collection of enormous quantities of wheat from the wheat regions of the Northwest, for its manufacture into flour, and for its distribution by railways and waterways to the large populations of the Middle and Eastern states and to Europe. The flour business, like lumbering, has brought a large population and increase of business to Minneapolis.

Wholesale trade.

There is still a third line of business in Minneapolis as important as the two already mentioned. What goods from the Eastern states are shipped into the two cities for sale and distribution over the Northwest? Dry-goods, wholesale groceries, machinery, drugs, china and porcelain, glass, hardware, tools and instruments, books and paper, and hundreds of other products of Eastern factories and mills, as well as those from Europe, are shipped to the Twin Cities to be distributed over the Northwest. Sum up, in a single statement, the three important lines of traffic which have given Minneapolis its importance as a trade centre.

Similar cities farther down the river.

Passing down the Mississippi in a steamboat from St. Paul, we notice at Wabasha, Winona, and La Crosse, at Dubuque, Davenport, and Rock Island, great sawmills and lumber yards even as far as St. Louis. An inquiry into the causes will show that the St. Croix, the Chippewa, and the Black rivers are lumber streams, bringing from the pineries of Wisconsin great numbers of log rafts to the mills of all these cities. The railroads extending westward into Iowa, Minnesota, and other states carry the lumber from these river cities to the prairies. Large flour mills are also found at most of these cities where wheat is received from the regions of the West, is milled and sent eastward as flour.

Compare now these cities along the upper Mississippi from Minneapolis to St. Louis; note how they differ in size, location, and importance. Note also whether they are alike. Compare them as (1) to having sawmills, and as to where the logs come from. (2) Compare them as to the manufacture of flour and the sources of the wheat. (3) Compare them as centres for the wholesale trade in goods manufactured in the East, and (4) as to advantages for river trade north and south, and railroad traffic east and west.

As a result of this comparison sum up the character of all the cities of the upper Mississippi as trade centres. Like Minneapolis, they are all centres for the lumber business, receiving logs from the pineries, working them up into lumber, and distributing them to the prairies. They collect wheat from the West, mill it, and distribute it to the East. They are also centres for the wholesale trade in manufactured goods. In short, the whole upper Mississippi River, with its cities, forms one great link of communication between the pineries of the North and the prairies of the West, and also, by means of railroads and lakes, between the populations of the East and of the Northwest. Minneapolis is the chief representative and type of this whole series of cities on the upper Mississippi River.

Other manufacturing and trade centres.

But let us inquire if there are other important centres of the lumber trade besides the cities of the Mississippi. Locate such cities on the Great Lakes as Chicago, Milwaukee, Saginaw, Detroit, Buffalo, Cleveland. Show where they get lumber and in what directions it is sold and delivered. The Great Lakes are found to be in the midst of extensive pineries, while the cities mentioned are the trading-points for collecting and distributing lumber southward to the large populations of the Middle states. What advantages has the city of Albany, N.Y., for the lumber trade? Canals connect the upper Hudson at Albany with Lake Champlain, Lake Ontario, and Lake Erie. What advantages do these canals offer for the lumber trade? What cities of Maine and New Brunswick are noted for lumbering? Where do they get the logs, and how and whither is the lumber distributed? What other cities of the United States are important for trade in wheat and flour? What other cities of the United States are located, like St. Paul and Minneapolis, at the head of steamboat navigation on important rivers? Are any of them noted for their water-power? What raw products are collected at Pittsburg? What are its factories? Compare Pittsburg and Allegheny with St. Paul and Minneapolis, in advantage of location, as trade centres for great staple products, in manufactures, and in population.

In future geographical study the city of Minneapolis and the group of cities on the upper Mississippi, of which it is the special type, may serve as a standard of comparison in measuring the commercial importance of other large trade centres.

Wisdom better than Gold

In bringing moral and religious ideas to the attention of children, many teachers begin with some general statement or proverb which serves as a text for the lesson. If the teacher's purpose is to bring out the idea of a selfish love of money and its evil effects, such a proverb as "How much better it is to get wisdom than gold," or "The love of money is the root of all evil," is selected. Remarks are made upon the truth of the proverb, and simple illustrations of the evil effects of the excessive desire for money are presented. According to the same method we have a number of books designed for moral instruction, which contain short treatises or sermons on points of moral conduct. These are read to the school, commented upon, and perhaps further but briefly illustrated. This plan seems to many persons a short and easy way of presenting moral truths to children.

Quite a different process of getting at a moral truth is illustrated by the use of the story of the Golden Touch, in Hawthorne's "Wonder Book." Here we have simply a story full of interesting personal detail, with no prominence at first given to the moral. Toward the end of the narrative the moral idea may be keenly felt, though not expressly stated in words. The contrast in these two methods of bringing out a generalization is striking. The first method described above gives at the start dogmatic statement and prominence to the moral truth, while the method of the story gives only a hint at the beginning of the moral involved, but allows it to be developed incidentally in the course of the narrative. A few questions at the end of the story will bring out the moral idea with great clearness. This narrative is in its nature inductive, and its presentation to children might take place as follows: —

How a King loved Gold and what came of it

Having so many things, why should kings wish for anything more? If you were a king what would you wish for most? What would you wish for now if you had your choice? We shall see in this story that a certain king was given his choice of the thing he most desired and what came of it.

Tell the story as given in the "Wonder Book" (pages 55–60), which narrates how Midas came into possession of the Golden Touch. Let the children ask questions. Let the teacher answer as well as she can and ask others to bring out the significant thoughts. The children should tell the story again till they acquire skill and ease in its reproduction.

The following questions are suggested: —

What opinion have you of Midas, in the dungeon, counting over his money? How might he have spent his time better? When Quicksilver gave him his choice, did Midas stop to think whether his wish was wise or not?

Tell the story of Midas while he had the Golden Touch (pages 60–70).

When Midas found that he had the Golden Touch, how did he feel and act? When did he first discover that the Golden Touch was not entirely pleasant? How many times did he find out later that it was a cause of trouble? What were the worst things that happened to him because of the granting of his wish? How did Midas feel when he found out just what the magic touch meant? Could he help himself in any way? Did he have exactly what he had wished for? What had he that he didn't wish for and had not counted on? What could he have wished for better than the Golden Touch? How did he come to make such a mistake? If Quicksilver understood Midas's mistake at the first, why did he not tell him of his foolish choice? What would have happened if Midas had not been able to get rid of the Golden Touch? Was he really anxious to get rid of it? What reasons had he for being more anxious to be rid of it than he was in the first place to have it?

Tell the last part of the story (pages 70–74).

Did Midas waste any time in waiting to rid himself of his gold? How much gold did he throw away? When he had sprinkled his little Marigold and the roses back into life, in what respect was he worse off or better off than at the beginning of the story? Do you think he would spend much time in the future in the dungeon counting over his money? What lesson had he learned? He was a much wiser man than before.

Have you read stories before in which persons were given a choice of anything they might wish? Recall the story of Baucis and Philemon.

If the children are familiar with this story, let them compare the choice of Midas with that of Baucis and Philemon, and give reasons for thinking their choice a better one.

Why did they not choose gold as did Midas? By choosing wisely, what other good fortune did they receive? Recall also the story of Solomon and his choice. What did Solomon get besides what he asked for? Why was his choice more sensible than Midas's? Did Solomon have any reason for regretting his choice? How was it with Baucis and Philemon? Is it a good thing in choosing to prefer money or wealth before other things? What things are more valuable than money? In the stories referred to, what things prove most valuable in the end? What least? Recall Proverbs xvi. 16, "How much better it is to get wisdom than gold."

Do you know what a miser is? Of what value is money to such a person? What are some of the most valuable things that boys and girls may choose to-day? In the choice of friends and companions, is there much danger of making a mistake? Should wealth have much to do with it?

The usual social life of the school offers many opportunities for illustrating and applying such lessons as are found in the Golden Touch. The lessons in reading and history may also supply good comparisons.

The Metamorphosis of Butterflies — The Milkweed Butterfly as a Type

One of the older zoölogies gives the following description of the order Lepidoptera, to which the butterfly belongs: —

"This well-known and most beautiful of all the orders of insects comprises the butterflies and moths, the former being active by day (diurnal) and the latter mostly by twilight (crepuscular) or at night (nocturnal). In all the Lepidoptera the mouth of the adult insect is purely suctorial and is provided with a spiral trunk fitted for imbibing the juices of flowers. The wings are four in number, and are covered more or less completely with modified hairs or scales, which are pretty objects under the microscope, and from which the wings derive their beautiful colors. The larvæ of the Lepidoptera are generally known as caterpillars. They are wormlike, provided with masticatory organs, fitted for dividing solid substances, possessing false legs in addition to the three pairs proper to the adult, and having attached to the under lip a tubular organ or spinneret, by which silken threads can be manufactured." (Nicholson.)

In the above lesson we have a verbal description of the whole class of butterflies to be studied and learned by the student.

The following treatment of the milkweed butterfly is based upon the idea of observation by the children, questions, comparison of data, collections, and conclusions drawn from direct experience with the objects studied. The method of question and discussion can be indicated only in part: —

In your previous observations in the fields and roads, tell of the habits of those butterflies which you have seen, their peculiar flight, whether they have been noticed on flowers or in damp places. What butterflies are you most familiar with? What is their food? Do you know what the butterflies come from? Have you seen the chrysalis of a butterfly and watched its change? What was its form before it became a chrysalis? Does it seem possible that a butterfly could come from a caterpillar? Have you noticed that certain butterflies prefer a certain kind of plants, and what the caterpillars feed upon? Do caterpillars grow larger and change?

For a closer understanding of the changes that take place in a caterpillar and in other forms we will follow the life and changes of the *milkweed butterfly* from the laying of the eggs to the full-sized insect in its later life. (Samuel H. Scudder's "Life of a Butterfly" will be very helpful to teachers in telling where and when to look and in explaining many facts derived from fuller scientific studies, published by Henry Holt & Co., New York.) The principal facts, many of which can be observed by teacher and children, are briefly told as follows:—

Stages. As early as April or later in summer the butterfly deposits its eggs (shaped like a sugar loaf, one-twentieth of an inch in height) on the under or protected side of the upper and tender leaves of the milkweed. The eggs hatch out in from three to five days, depending on the warmth of the weather. As soon as the little caterpillar gets out of the egg it turns and eats the shell, and then begins to feed on the green leaf of the milkweed. It is a great eater, and as its food is always at hand it spends most of its time eating and resting, day and night. (Let the children notice these facts as far as possible, and observe whether it is careful to stay on one side of the leaf.) In a day or two after hatching, the caterpillar makes its first *moult*, or sheds its skin. It grows so fast that its skin splits off and it comes out in a new, shining coat. Three other moults follow before it reaches its full growth, lasting in all at least eleven days, but usually longer. When full grown "the caterpillars are striking objects, cylindrical, plump, naked worms, growing to the length of nearly two inches, with transverse bands of yellow and black." (Scudder.)

"Then comes the change to the chrysalis, to seek a good place for which the caterpillar usually leaves the plant (though I have found the chrysalis hanging pendant from the leaf) and seeks some such stable place as the under side of a fence rail, or a jutting rock, from which to suspend. Here it hangs for a variable period — two to fourteen days, according to the season and temperature, and perhaps the exposure." "At last the golden spots (on the chrysalis) begin to lose their brilliancy, and the beautiful green disappears; the orange wings of the imprisoned butterfly now become visible through its temporary sarcophagus, which it bursts open on the following day, and the liberated insect soon takes wing to join its comrades, select its mate, and pass the happy hours of a brief existence in revelling in the sweets of the flowers among which it sprang into being." (Peale, quoted by Scudder.)

The milkweed butterfly is one of the commonest and most widely distributed of our butterflies. Collect two or three specimens from the meadows, noticing meanwhile their flight, places of lighting, size, and color. It measures four or five inches from tip to tip of its wings. It has two pairs of large orange-colored wings trimmed in black. But the margins are dotted with white. The veins on the wings and the body of the insect are black dotted with white spots. "Of easy, quiet flight when undisturbed, often sailing smoothly with widespread wings, yet ever ready to do battle with a tempestuous wind, a reckless adventurer in its contrasted livery of orange and black, it seems the very beau-ideal of the contented, happy-go-lucky butterfly."

Special organs. The organs of the butterfly worthy of special study are the wings, the eyes, the tongue, the scales, and the legs. A close examination of the delicately formed and beautiful wings gives us a striking view of nature's handiwork. An interesting question has arisen whether the butterfly can see clearly, and whether it does not direct its movements more by smell and touch than by sight. The tongue, coiled up like a delicate watchspring, is formed by fastening together two long, hairlike half-tubes. These, when uncoiled and properly joined, form a long, slender, tubelike tongue, with which the butterfly reaches down into the cups of clover, milkweed, and thistle blossom, and draws up honey for its food. The scent scales are of peculiar importance, and the protective coloring of caterpillars, chrysalides, and butterflies, by which they manage to escape their enemies, has been studied with much interest by entomologists.

At all the three stages, of egg, caterpillar, and chrysalis, the insect is in danger from open and secret enemies. The great majority of eggs are probably eaten before hatching out, by spiders and large insects, and by small parasites. The caterpillars are in constant danger from spiders, crickets, and bugs, from birds and reptiles, and from the parasitic flies that lay their eggs in the grubs and destroy many.

The milkweed butterfly is found in summer as far north as Hudson Bay, and throughout all parts of the United States where the milkweed grows. It is supposed to be properly a tropical insect. In summer it is believed to migrate northward with the season, and in some cases south of parallel thirty-one, to come out again in the spring to lay eggs, while many probably migrate southward to warmer regions to continue their butterfly life. It is claimed that the insect may pass the winter in the egg state, as a caterpillar, a chrysalis, or as a full-grown butterfly.

Other butterflies.

During the same season what other butterflies do you see commonly along the roads and fields? Find in the garden some of the cabbage butterflies. Try to find the eggs and caterpillars. Watch their development and see if they go into the chrysalis state. Watch any of the common caterpillars and notice the plant on which they feed, the moulting, and the successive changes till maturity is reached. See if different butterflies get their food in the same way.

In comparing the different common caterpillars and butterflies observe the different plants and flowers on which they feed, the varying localities in which they are found, the differences in size, coloring, and mode of flight. Compare the whole period of development in one butterfly with the similar period in another species. Can we mark distinct corresponding stages in all the butterflies observed? Do we find corresponding organs and modes of feeding in the different caterpillars and also in the butterflies?

What is the outcome of this comparison of the full life history of different species of butterflies? Briefly stated, it is that four distinct stages are clearly marked in the life of all the specimens observed and studied:—

1. The egg. 2. The caterpillar with its moultings. 3. The chrysalis or quiescent condition. 4. The full-winged butterfly. The mode of life in each of the two active stages is very similar in different caterpillars and butterflies.

We have examined, however, only a few different species of butterflies. In your future excursions observe the caterpillars, chrysalides, and butterflies, with their life habits and changes, and see if your previous conclusions are correct. Notice also the life and metamorphosis of other insects, as moths and flies, and discover whether similar changes occur.

In Unity is Strength

This is one of the most important truths taught in history. A deep conviction as to its value led to the confederation of the colonies during the Revolutionary War, to the adoption of the Constitution soon after, and to the Civil War. As a political doctrine it has always been bitterly opposed by extremists in favor of states' rights. But the future security of our government and the welfare of our people are so greatly dependent upon its universal acceptance and practical realization in our laws, that it should be as carefully taught in history as are the laws of gravitation in physics. The portion of our history that, by contrast, most forcibly teaches this proverb is the period immediately following the peace of 1783. Barnes[1] devotes to it not quite one page, under the heading, "Weakness of the Government." He states that under the Articles of Confederation Congress *could recommend*, but not enforce; that bitter jealousies existed among the several states; that there was a popular desire to let each state remain independent; that a heavy debt had been contracted, which Congress was unable to pay; that people rebelled against payment of taxes; and that in these circumstances many of the best men of the land felt the need of a stronger national government. This is a typical text-book treatment of the matter. No direct reference is made to the above proverb, but the same general truth is inferred from a brief statement of several important facts.

1 "Brief History of United States," p. 142.

Following is the more detailed and more inductive treatment of this idea of unity: —

Let us consider what prevented the union of the thirteen colonies from breaking to pieces shortly after the close of the Revolutionary War.

What had caused their union in the first place? How long had it lasted? Was it effective? In what respects was it defective?

Even during the Revolutionary War, when there were the weightiest reasons for close union, the colonists were not fully united. Congress had failed to raise sufficient money, to levy sufficient troops, to act with decision, etc. What was the cause of these defects? Congress was not endowed with large powers. But why not? Because the individual states were unwilling to surrender important rights to any central authority. What reasons, then, can be given for dissolving the Union at the close of the war? The war was finished on account of which the Union was formed. Also, each state wished to secure to itself all power possible.

Let us see what facts changed this feeling: —

1. According to the conditions of the treaty the states were to protect loyalists, restore to them property confiscated, destroyed, etc. Who was to attend to this? Congress. But Congress did not have sufficient power. What must have been the result? The conditions of the treaty would not be fulfilled. Would England, then, be bound to observe the treaty? What

effect would this weakness of Congress have upon the general opinion entertained in foreign countries in regard to our own country?

2. At the close of the war most of the European nations were anxious to enter into commercial agreements with the United States. But when they saw the weakness of Congress, what assurance could they feel that such agreements would be fulfilled on our part? Effect?

3. The states together had contracted a war debt of about $150,000,000. They were already poor, and little inclined to levy taxes in order to pay it. Congress, too, had no power to force payment from them. What effect would that have upon our credit at home and abroad?

4. When the Massachusetts legislature, in spite of much opposition, attempted to levy taxes for the general government, a serious rebellion was kindled, known as Shays's Rebellion. Congress did not interfere. Can you imagine the reason? It was afraid to.

5. American citizens were seized and sold into slavery in the markets of Algiers and Tripoli with little hope of energetic attempts at rescue by our government.

6. Congress was even unable to defend itself against violence. In 1783 it was driven out of Philadelphia by eighty mutinous and drunken soldiers. Did such facts bring honor or dishonor to those persons who

were unwilling to grant important powers to the central government? Why?

7. Since there was no national coinage, what kind of coins would be in use? If English, French, German, and Spanish coins of various and uncertain values were the only coins in circulation, what would be the effect upon trade? What would prevent clipping and counterfeiting? How would a cautious merchant protect himself from deception?

8. What authority would settle disputes that might arise among the thirteen states? If there was no authority to do this, what might easily result?

(*a*) There were such disputes in abundance. The larger states wished to become rich at the expense of their weaker neighbors. New York levied tariff duties on firewood from Connecticut, and upon butter, cheese, chickens, and vegetables from New Jersey. The New Jersey legislature in defence levied a tax of $1800 a year on the lighthouse off Sandy Hook, belonging to New York. The Connecticut merchants pledged themselves to suspend all commercial relations with New York for twelve months. Pennsylvania discriminated against Delaware. Thus fuel for war was being collected.

(*b*) Differing policies in regard to importation of European goods widened the breach between the states. When the other New England states had virtually closed their ports to British merchandise, Connecticut, catching at an advantage, threw hers wide open.

(*c*) There were territorial as well as commercial disputes.

Connecticut and Pennsylvania had each claimed the Wyoming valley. It had been adjudged to Pennsylvania by a special federal court, although largely settled by the hated Yankees. In 1784 great suffering was produced in the valley by floods and cold. Then the Pennsylvanians, instead of furnishing prompt assistance, sent militia into the region, who plundered and burned the property of the Yankees and drove them into the wilderness. War between Connecticut and Pennsylvania was narrowly averted after some fighting had taken place.

The territory now known as Vermont was claimed by New York, Massachusetts, and New Hampshire. Troops were collected for the support of these claims, but war was temporarily prevented through Washington's intervention.

From these data we see that our country was unable to command the respect of foreign nations, and even of its own citizens ; Congress could not carry out its agreements, pay its debts, protect its citizens, or even itself ; trade was greatly hindered because there was no central power with authority to control coinage. The jealousy among the states was leading to hostile legislation that threatened civil war; civil war was further kindled by commercial and territorial disputes.

The only remedy for the evil in each case was a strong central authority; only through such an authority could the individual states be forced to abide by the conditions of the treaty; it only could levy taxes, quell insurrection, pay the national debt, protect its citizens, and thus command general respect. Only by means of this authority could the jealousy among the states be kept within bounds, the commercial and territorial disputes be properly adjusted, and frequent civil war be avoided.

In consequence of these facts union became a necessity; wise men came more and more to feel the force of the proverb that, "United we stand, divided we fall," or "In unity is strength."

After long discussion by representatives from the states and many exciting scenes in their convention, the final outcome was the adoption of the Constitution, establishing a strong central government.

Questions

1. Why is the period immediately following the Revolution called the critical period of American History?

2. Is the union of our states permanently established? If so, when was it accomplished? If not,

when will it probably be accomplished? Give proofs.

3. What great orations have been delivered bearing upon this question? What was the occasion of their delivery?

4. There are already three different governments upon this continent, — Mexico, the United States, and Canada. They are fairly prosperous and living in harmony. Would you risk being shot at and killed in order to prevent the establishment of a fourth government? Why? Have our citizens ever had to answer that question in a practical way?

5. On what other occasions has our Union been threatened? State the circumstances.

6. What European nations have suffered particularly from lack of a strong central government? What was the nature of their suffering, and how long did it last? (Germany and Italy.)

7. What modern inventions have greatly aided in making a close union of our states possible? How?

CHAPTER III

HOW INDIVIDUAL AND GENERAL NOTIONS ARE DISTINGUISHED FROM EACH OTHER

ALL knowledge is built up from individual and general realities, so that instruction is always occupied with one or the other. It has been seen that differences in method are due first of all to the order in which these two are presented; some teachers would begin with the general notion or rule, and furnish the individual instances later, as the rule for the plural of nouns ending in *s*, *x*, *sh*, etc., while others would take the opposite course. Since these two kinds of notions are of vital importance, it is well to have a clear understanding of the meaning of each.

Sources of individual notions.

The notions that are furnished apparently through the senses alone are individual notions. For instance, the images of the many things about us gained through the sense of sight belong to this class. I have an individual notion of the penholder with which I am now writing, of the room in which I am sitting, and of the meadow that I see from my window. Touch, without the aid of sight, gives a similar kind of notion; blind men get definite mental pictures of the objects about them by the use of their hands. It is an individual notion that one receives when he perceives the color of a flower, the odor of an apple, or the chirp of a bird. Thus each sense may be the source of individual notions or percepts, without the aid of the others. Usually, however, they work together, giving a combined result, as when one determines through the senses of sight, smell, touch, and taste that a certain object is an apple. In this case the idea is certainly very complex, but since it must be referred to one definite object it is called an individual notion.

Further than that, individual facts and relationships, as well as material things, are a source of particular notions. For example, when we read in history that Guy Fawkes attempted to blow up the English Parliament with gunpowder in 1605, we picture an individual fact or notion. Again, when we say in grammar that the word *Parliament* in this sentence is the direct object of the verb *blow up*, and is, hence, in the objective case, we speak of the individual relation existing between a particular word and another expression; in other words, we have a fact in mind which is as individual or concrete in its nature as is the color of a particular flower.

Origin and growth of general notions.

The nature of general notions is best seen by directing attention to the way in which they arise. If one has seen but one chair, he has, then, only an individual notion of chair; he has an object in mind of a certain size, color, material, weight, shape, etc. On seeing a second one, differing only in material from the first, the material of which it is made begins to be recognized as a subordinate matter. Let a dozen different kinds be seen, and more of those properties that are variable or individual come to be recognized as such; as, for instance, the color, weight, shape, etc. But some characteristics remain ever the same, though they be few in number. Each chair would be found to have a back and to be intended for a seat. If one hundred of them were perceived, these common qualities would appear one hundred times, while others would appear only once, or several times, but not all of the time. These common or general properties compose the general notion, so far as it has been found. There is one important limitation, however. It could easily happen that each of the hundred chairs seen has not three or five legs, but just four. In that case, according to the statement just made, the general notion chair might signify an object with a back and four legs, that was intended for a seat. But although all chairs thus far made were made with four legs, we know that it is not a necessary or essential property of chairs; they can have a larger or smaller number. Hence the word *chair* should signify an object with a back and intended for a seat. The idea expressed by this definition is what is meant by the general notion chair;

it is the sum of those characteristics that are both common and essential to chairs.

It is by no means easy to distinguish the essential qualities of an object from those that are common or usually present, but accidental. Every individual thing has very many characteristics, most of which are entirely peculiar to itself. But it requires much study to determine whether some of the more common ones are essential or not. For example, is it a necessary property of chairs that they be movable, that they be intended for one person, and that they approximate a certain size? Webster's dictionary includes the first two of these three limitations in the first definition of chair; it states that a "chair is a movable single seat with a back." Evidently the third is not considered a necessary property. Owing to the great difficulty in distinguishing what qualities are absolutely essential to a given object, it is seldom that really correct general notions even about common things are reached. Few educated men can correctly define table or knife, or house on the spur of the moment, or even after reflection. Likewise, their conceptions of trade-centres and of social laws presented through literature and history (as suggested in the preceding chapter) are often quite undefined.

Difficulty of getting accurate general notions.

Still, children have a vague general notion of these things. Wherein, then, are their generalizations different from those of educated people? The difference lies in the degree to which accidental qualities are distinguished from essential ones. For a clear understanding of general notions it is necessary to realize that there are two kinds; namely, the *crude* and the *pure*.

Psychical and logical general notions.

As soon as children begin to use the plural number, to say even *two* intelligently, they are beginning to generalize. Of course, the individual characteristics of things are entirely confused with those that are common and necessary, and this confused state of mind exists throughout childhood. It is the only state reached by uneducated people in regard to most things. Such crude concepts are technically named *psychical* notions.

As already stated, even carefully educated men do not entirely escape this confusion. But their concepts are so much more nearly correct that they are often given a separate name, *i.e. logical* notions. A really logical notion is one that is absolutely correct, or one that is entirely free from accidental properties; it is, therefore, a pure notion, in distinction from the crude (or mixed) ones held by the uneducated. It is rather the ideal toward which people work than the goal which they actually attain, although in certain studies, as mathematics and grammar, logical notions are probably reached. It is one of the chief aims of instruction to develop psychical into logical notions; progress in education means a clearing up of crude notions. Children should be gradually led to set aside, as unimportant, many of the qualities of things that they have been accustomed to consider as essential, and to recognize as necessary some that they have heretofore overlooked, so that they may perceive the general notion or law involved. It is very important to realize that, though logical notions can never be fully reached, instruction is always striving to attain them as nearly as possible; they are really the goal of instruction. A general notion, as its name implies, does not refer to one particular object and to no other, but to many of the same sort, as the word *river* to a whole class of objects. It differs from individual notions just as common nouns differ from proper names. The latter apply, in each case, to only one certain object, as Illinois to one of the Central states, while the former refer to any one of a class, as *child* to any one of millions of persons. Proper names compose a relatively small class of words; almost all other words stand for generalizations; for instance, the verb *run* signifies a certain class of actions; *sweet*, a quality common to a great number of objects; the preposition *underneath*, a kind of relationship that may frequently exist between objects. Each of these notions, instead of applying to a single case and to no other, covers a multitude of individual cases or classes.

Distinguishing marks of individual and general notions.

Knowing now the nature of individual and general notions, it is comparatively easy to recognize each in its various forms. Numerous examples of the former have been given. As to the latter, not only do almost all words signify generalizations, but the rules of grammar and arithmetic do the same. The definitions of mathematics, as of triangle, plane, etc.; the laws of physics, as the laws of pulleys and of gravitation; the principles of science, as the economical principle that man is by nature lazy, and moral maxims, as that we should do unto others as we would have them do unto us, are all general notions: they are all reached by the same process, by the separation of non-essential characteristics from those that are essential. Definitions, rules, laws, proverbs, principles, and maxims are general truths or notions: the individual instances illustrating them are individual truths or notions. In the second place, general notions distinguish themselves from individuals by the fact that the latter can be imaged or pictured concretely, while the former cannot.

Any particular chair presents a certain appearance; it has definite form, weight, color, etc., and the mental picture of it contains these particular characteristics. Any historical event has a peculiar setting; it was performed at a certain time and place, by a certain person or persons, under particular conditions, in a definite manner, etc. When it is reproduced mentally it must be accompanied with its peculiar environment. Objects and events that have never been actually witnessed, but only imagined, must also be pictured in detail in the same way. But general notions and laws cannot be thus clearly imaged or seen concretely. They do not apply to just one object, event, or relation, but to any and all of a class; in fact, they have no external objective existence, hence they cannot be limited to any certain form, color, time, place, setting, etc. The word *chair* signifies the common essential characteristics of *chair* without reference to any particular example; the preposition *underneath*, a relationship that may frequently exist between nouns or pronouns and other words without naming any specific case; the moral maxim, honesty is the best policy, calls to mind a general truth without mentioning any instances that illustrate it. Frequently, however, these instances are so close at hand that, when the general notion is presented, one or more of the individuals that fall under it come immediately to consciousness. When we think *horse*, it is impossible not to call some favorite horse into mind.

The last statement indicates the relationship properly existing between individual and general notions. The latter are not creations entirely separated from the former, but are intimately associated with them.

Relationship between individual and general notions.

[1] "The general notion is not a new mental product existing apart from and outside of the concrete notions, but it is *thought out* each time, inasmuch as a person from among the numerous ideas of the same kind (or also from only one idea) lifts exclusively the essential characteristics into the centre of conscious-

[1] Lange's "Apperception," p. 84.

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ness, and endeavors to isolate them from the others, which recede or withdraw (an attempt that is always, of course, only partially successful). It is like a melody that can be easily distinguished in a piece of music of several parts on account of special emphasis or peculiar registering, while, however, it never ceases to form a constituent part of the separate accords. It happens to us regularly, when we attempt really to think a concept and not simply to repeat the words of the definition, that we involuntarily glide down among its individual notions; that we hasten through these quickly and emphasize what is common and essential, rejecting the non-essential. The general is not really *separated* from the particular, but only *distinguished* from it; for deep down in consciousness it is always united with what is concrete."

CHAPTER IV

WHY GENERAL NOTIONS OR CONCEPTS ARE THE GOAL OF INSTRUCTION

THE declaration that logical notions are the goal of all instruction is so far-reaching in its bearings that it deserves further consideration. Pestalozzi called the attention of teachers emphatically to this truth, but he failed signally to apply it to his own teaching. Since his time men have commonly accepted his assertion as true, but, like him, have expended little effort in applying it to school instruction. In consequence, one of the weightiest thoughts in education has been largely overlooked by educators. How effect reform in this direction? It is certain that teachers will not labor persistently to reach after and apply generalizations in the classroom until they have learned both to distinguish between individual and general notions, and to appreciate the great value of the latter. The preceding chapter treated of the first of these two points — attempting to explain the difference between the two kinds of notions; the present chapter takes up the second point and aims to show why instruction culminates in generalizations.

Particular notions always the raw material of knowledge.

Throughout this discussion it should be borne in mind that the value of individual or concrete facts as the basis of all knowledge is by no means questioned. Undoubtedly the senses furnish the elements of all thought; it is only through individual notions, or percepts, that the higher notions, or concepts, can ever be reached. Modern philosophers, scientists, and teachers have demonstrated this principle so completely that it needs no further proof. Object lessons, excursions, pictures in class, etc., have been advocated so that learners might, through them, secure vivid concrete notions. Much of the recent reform in education has been along this line. Nevertheless the percepts thus obtained do not constitute the whole of knowledge; they are only its foundation; or, using another figure, they are the raw material out of which important thoughts are produced. But if instruction simply presented these facts and then ceased, it would be like the architect stopping when his foundation walls were finished, or the manufacturer ceasing work as soon as the wool was collected out of which cloth might be made. Such work by itself is useless; it must be followed by something more. So in education, percepts are not, *in and by themselves*, of vital importance to human beings; their worth consists not in themselves but in what they lead to or suggest beyond themselves; namely, concepts.

Some of the facts of instruction are often felt to

How to distinguish between useful and useless particular notions.

be too trivial for study. For example, who cares what the name of the man was who assassinated William of Orange? Even if one knew it to be Balthazar Gerard, what worth is there in the knowledge? Pestalozzi is said to have observed with care the cracks and the knot holes in the schoolroom wall with his pupils. But suppose that there are just twenty-eight cracks in the plastering of any room, you would smile at one's stating the fact, and would remark, "What of it?" On the other hand, any incidents in the boyhood of George Washington are highly treasured; the details of his conduct at Braddock's defeat, at Valley Forge, during his terms of office as President, and in his family, are preserved for all future generations. But why any concern about such events? Washington is dead, his age is past, most of his actions are not directly related to us. Why preserve them so carefully? Or what difference does it now make whether or not a certain man named Guy Fawkes did attempt to blow up the English Parliament with gunpowder in the year A.D. 1605? That was a long time ago, and our interests have shifted to very different scenes. Knowledge of that fact and its circumstances may happily prevent the appearance of ignorance at some critical moment, or help one to pass an examination creditably; but of what real use is it beyond that point?

The reason for this difference in the value of details is suggested by an analogy, *i.e.* the history of the attention given to falling apples. Probably apples have been dropping from trees ever since Adam and Eve tasted of the forbidden fruit; but such little events have elicited no special interest until they gave hints to a philosopher of the wonderful law of gravitation. Their value, therefore, consists not in themselves, but in what they suggest. The same is true of Franklin's experiment with the kite and electricity. It would be ridiculous to preserve all the details of that incident if there were no universal truth involved in it; but since it led to the discovery of another great natural law, it is justly famous. Likewise, the daring deed of Guy Fawkes is in itself without value; but if it is the means of revealing a general truth, it becomes important. In this historical event are revealed the boldness and wickedness of a few human beings, and the hostility that once threatened a strong government. Such facts indicate the possible wickedness of other human beings and the occasional hostility that governments must encounter. These generalizations act as warnings, and influence present action. As far as Washington's character is concerned, it would make little or no difference to us if he did struggle with almost superhuman power at Valley Forge, were not the qualities that he there exhibited recognized as being in universal demand. Seeing how he acted under adverse circumstances, we are reminded of the way in which all men should act. We forget that his was an individual character, and we idealize and universalize it. Then, by comparison of our own lives with this ideal, we recognize the demand made upon us for nobler living. Thus, the Washington of one century ago touches the men of to-day through the universal qualities of character that he presents. His life bears no immediate relation to our own, but it suggests rules of conduct which, being general or universal, are binding upon all individuals alike. The motives that controlled his actions could scarcely be even matters of curiosity now, did they not seem sufficiently admirable to possess this universal worth. On the other hand, since the exact number of cracks in a wall hint at no rule, it is worthless knowledge. Likewise, the learning of names of capes in geography, of margins of leaves, of dates, is likely to prove valueless, because such facts usually hint at nothing beyond, suggest no general truth or law. If this standard for the worth of details were more generally carried in mind, many facts ordinarily taught would be omitted, and often others would take their place.

One peculiar worth of general notions is found in the breadth of their application.

The study of past events is valuable, therefore, to the extent that they suggest laws which are applicable at other times and in other places. Concrete facts in all subjects of study are at least comparatively worthless, unless they are recognized as instances of general truths. Examples in arithmetic are ordinarily worked, not primarily for their own sake, but in order to reveal the law governing the process involved.

Everywhere general notions are of especial value because they find a broader application than individual notions; they possess universality. This thought has been tersely stated by Kant in his assertion that, "*Anschauungen ohne Begriffe sind blind*," or, Concrete notions without generalizations are blind; they reveal nothing, they apply to nothing. Hence we conclude that the first great use of generalizations is in securing unlimited application or universality to knowledge. It is probably incorrect to say that they are more important than individual notions, for both are indispensable. One would scarcely say that the light in a lighthouse is more important than the lighthouse itself, for the latter is the condition of the former; yet the tower was constructed in order that it might contain the light, and it would be worthless without it; hence it finds its value in the light that it carries. The final object of the entire structure is to furnish light. So the final object, the goal of instruction, is the generalization, although individual notions are indispensable in attaining it.

How generalizations are related to thinking and to the expression of thought.

Second, generalizations are a necessary condition both for thinking and for the expression of thought. Probably very little thinking takes place without the help of words, or symbols that are equivalent to words; they are the only track upon which thought glides along smoothly. That being the case, it is evident that if all words signified individuals, as do proper nouns, thought would be very much limited. Without general terms, *i.e.* without common nouns and the other seven parts of speech, all general notions, rules, maxims, laws, etc., would fail us. Argument would be impossible, and logical conclusions could not be drawn. But when general terms are allowed, and when the concepts for which they stand are abundant, thought becomes free. Not only that, but when concepts are well developed, a great *impetus* is given to thought. For example, if the general truths are well established in one's mind that heat expands and cold contracts, or that everything that happens has an adequate cause, one is prompted to make many applications of this law to practical affairs. Philosophers, scientists, etc., who have reached a large number of such generalizations, are continually occupied in using them as the basis for new hypotheses. Thus great mental activity is secured and valuable conclusions are reached.

The free expression of thought to others is also involved in the existence of concepts. If two persons were continually seeing different objects and having different experiences, while general terms were wanting, there would be no way for one to communicate his ideas to the other. Any word employed would signify only the particular experience of a certain individual. But with an abundance of concepts and terms for the same, thoughts can be readily communicated; then, even though people be not acquainted with the same individual objects, the common use of the same terms allows any word to signify essentially the same thing to each mind.

How general notions are related to the organization of knowledge.

A third important consideration is that the possession of carefully developed generalizations signifies a good classification of one's knowledge. In order to be of practical use the books in a library must be carefully classified or arranged in groups, those of a kind being placed together. This is a matter of so much importance that in any large library several men devote all of their time to this work. Without such care books are forgotten or cannot be found, and hence they prove useless. The mind is practically a great library in which ideas need likewise to be carefully grouped. It is of little value for a man to collect a large number of precious experiences if they cannot be found when wanted. Chaos is as utterly opposed to utility in the case of ideas as in the case of household furniture, toilet articles, books, etc.

As already seen, nature compels some degree of classification of our notions, for the essential characteristics of an object are presented to us in each individual of a class, while the non-essentials are likely to appear only once, or a few times. Consequently the class notions are especially impressed upon the mind. But this help of nature, or this natural tendency to classify, is not sufficient. Special effort must be made to harmonize and rightly group our ideas; otherwise they will be often contradictory to one another, or poorly defined; and those which are quite unrelated will be found in the same group, just as books under widely varying titles may by accident be placed together.

But proper classification involves more than the careful separation of experiences into groups; it involves the ranking of the same according to their *relative worth.* Some facts are of far more value than others, just as the officers of an army are far more important than an equal number of common soldiers. Unless one's generalizations have been carefully developed, one is likely to overlook this matter of relative worth and to neglect the higher and especially important notions. Teachers who have had no professional training show this tendency plainly. Their minds are so occupied with the details of teaching that they fail to distinguish more important from less important matters, and the idea of supreme importance, namely, the chief aim of instruction, is the one most neglected in their daily thought.

It is, on the whole, the organization of knowledge that is here involved. In this age of unbounded faith in the efficiency of organization in all fields, the organization of thoughts should not be neglected.

It is the most economical means of caring for one's knowledge. Ideas that exist in a chaotic state are wasted; the more valuable the collection of them, the greater the waste. Until they are assorted according to their essential characteristics, and ranked according to their worth, it is impossible to retain them in memory, to survey them easily, and to find them at the moment of need. Since to generalize means to sort and rank notions, the reason is plain why instruction should culminate in generalizations.

How general notions aid the acquisition of knowledge.

There is a fourth reason for regarding generalizations of supreme importance. They are the means of apperceiving new experiences of any kind. It is through them that it becomes possible to acquire knowledge quickly and easily. Just as a new book readily finds its proper place in a well-classified library, so strange ideas readily find classification in a mind whose contents have been carefully arranged. This is seen in the reading of books on education. One who approaches a pedagogical work with an organized or systematized body of educational thought has a framework into which to place the ideas. He knows quickly where each idea belongs, so that even if the arrangement of points in the book is poor, it need not be poor in the mind of the reader. Also, as in an army the relative rank of men can be quickly determined, so the relative worth of the many thoughts can be recognized. The system of thought (or the organized generalizations) already at hand is both the framework in which all ideas can be pigeonholed, and also the standard according to which their value can be measured. Thus, the profit from reading, from sight-seeing, and from conversation is directly dependent upon the extent to which one's ideas are brought into order and ranked. It is only through classification that much confusion and loss of time in the acquisition of knowledge can be avoided. Generalizations are, then, to the thinker what the compass is to the seaman: they enable him to keep his bearings, to remain free from confusion in new regions.

That generalizations play such an important part in the acquisition and organization of knowledge, suggests an important requirement bearing on the selection of leading topics in each study of the school course.

How generalizations are the basis for division of studies into large topics.

We are getting into the way of thinking out large topics as units of instruction in many of the school studies. In reading and literature we treat whole poems, stories, and even the longer masterpieces as units of thought. In history we select biographical stories and commanding topics, like the Puritan emigration or the growth of our territory, or internal improvements as units of instruction. The study of geography and natural science by types is also a distinct movement toward the use of large units of study.

Now *general notions afford an excellent basis for division of subject-matter into large topics*, as is shown in our two chapters of illustrative lessons in this book. In each of those examples the general truth is what gives connectedness and unity to the whole. For instance, the general truth, "In unity is strength," establishes a close relation, or sequence, among a large number of particular facts, and thus groups them into one large topic. Likewise in the Metamorphosis of the Milkweed Butterfly, in the Golden Touch, in Minneapolis as a Trade Centre, and in the Addition of Fractions there is the same organization of materials into one large unit. So, in every study, the entire subject-matter should be arranged in these large topics; that is, the teacher should determine beforehand the general truths to be taught, and should collect and arrange the details in each case which lead to them. Fortunately, in arithmetic this has already been done completely, and each lesson contributes to some rule, apparent even to the children.

But where this is not done, miscellaneous collections of facts are made and committed to memory, as when children in beginning the geography of New England are asked to learn a list of products, as follows: boots and shoes, granite, cotton goods, lumber, firearms, fish, paper, ships, wooden ware, maple sugar, etc. This means disorder and confusion.

The prime defect in such cases lies in the original selection and arrangement of the subject-matter without much regard to controlling principles. A study is looked upon as a large accumulation of single facts, when it should be considered as a series of large topics, each containing a general truth.

If we can once get this idea of large units of instruction, each determined and organized by a central truth, we can more easily understand and apply a rational method of dealing with such units. The following chapters endeavor to bring this truth out more fully.

CHAPTER V

DO GENERALIZATIONS PRECEDE OR FOLLOW INDIVIDUAL NOTIONS?

It has been shown that general truths are the central objects of interest in instruction. The process of acquiring knowledge consists in securing an insight into them and the ability to apply them easily in all possible directions. For instance, one has added much to his knowledge when he has come to see clearly the single general truth that the presence of a definite aim is the condition of effective work in any line; the teacher may apply this generalization first of all to the school, seeking out the great purpose of instruction; then to each branch of study, and to each recitation; finally, he may apply it to other spheres of activity, as to that of the lawyer, of the minister, and even to human life as a whole; one may never finish the application of such a broad truth, but knowledge grows as insight into it and ability to apply it are increased.

The inquiry next in place touches the manner in which generalizations should be reached. Should they precede or follow the study of individual notions? The first distinction between good and bad method, or the first test of method, is found in the answer to this question.

How the race began to acquire knowledge.

It is scarcely possible to conceive that primitive man began work with an outfit of general notions. On the contrary, he certainly had to discover the simplest facts for himself.

By experiment in its childhood the race learned that flint makes good arrowheads, that meat spoils quickly in warm weather, that the deer has certain habits. Higher truths have been reached by more developed peoples, but by the same route. Very slowly have the laws been attained that pertain to falling bodies, to the properties of gases, the pressure of air, etc. The data for the same have been recorded one after another, and often centuries have elapsed between the time when the data for a great law were recorded and the time when the latter was really brought to light. In other words, the progress of the race has been necessarily experimental and inductive; it has reached the abstract or general through the concrete or individual.

How the child must begin.

In many respects the child is an imitator of the race. It is asserted by numerous eminent authorities that the chief stages in his development correspond in a large way with those of the race. If he passes through the same great culture epochs as his ancestors, it is quite possible, then, that his approach to general truths is the same as theirs.

Herbert Spencer is of the opinion that this is the case. He says, in substance, that the mind of humanity, placed in the midst of phenomena and striving to comprehend them, has, after endless comparisons, speculations, experiments, and theories, reached its present knowledge of each subject by a specific route; that the relationship between mind and phenomena, it may rationally be inferred, is such as to prevent this knowledge from being reached by any other route; and that, as each child's mind stands in the same relationship to phenomena as that of humanity, they can be accessible to it only through the same route.[1]

Aside from this argument, the proper answer to the question whether the statement of generalizations should precede or follow the study of individual notions, seems almost self-evident from the discussion in the previous chapter.

Another reason why concepts should follow percepts.

Since concepts or general truths can be drawn only from percepts or individual instances, it seems necessary that these latter should be presented and discussed before the former are deduced and worded. Just as the acorn must be present before the oak can be produced, so the concrete example must precede the abstract rule; in both cases growth is involved: in the one instance it is a material growth, in the other a psychological one. One might as well expect noise without vibrations as generaliza-

[1] "Education," Chapter II.

tions without particulars. And the order in which individual and general notions are produced should fully determine the order in which they should be studied by children. To think them out clearly means indeed to produce them.

General truths are not a finished product that can be handed about from person to person, examined and traced back to their origin. Each man, in order to have them really, must give birth to them within his own mind, and they must be born out of the individual notions that are already there present. "The general notion is not a new mental product existing apart from and outside of the concrete notions, but it is *thought out* each time, inasmuch as a person from among the numerous ideas of the same kind . . . lifts exclusively the essential characteristics into the centre of consciousness and endeavors to isolate them from the others which recede or withdraw." It is not, therefore, the business of the teacher to retail ready-made general notions. *General truths should be taught after individuals;* that is the proper sequence.

Why general truths are often presented first.

Yet the world has for ages allowed the other order, and probably to-day the great majority of teachers present first the rule, then the example. Almost all text-books were modelled after this plan until very recent years; gradually, now, books following the inductive method are being introduced into the schools. One explanation of this error is that it seems to the instructor *much easier* to teach in this way. It requires great energy to collect a large number of facts, and then so to arrange and compare them as to lead to an important law or truth. And especially does it require great energy to keep this course up. No wonder, then, that it has not been usually done. If we want children to comprehend and learn important principles, why not give them these latter outright? Or, still better, why not give them these together with a few examples — then the result is assured. So teachers reason, and so they act, thus obeying the universal desire to avoid work. Another reason for this short-sightedness is found in the desire to *save time*. It is a very slow process to approach broad truths inductively. It seems a much shorter, simpler route to learning to offer rules outright and have them committed to memory with a few illustrations.

But labor and time are lost.

However, this inverted order means a loss rather than a saving of time and labor. For instance, when children begin *mode* in grammar by learning that it is "the manner in which the action, being, or state expressed by the verb is stated or conceived," time is lost, because these are mere empty words until the pupils have been made conscious, through numerous examples, that there are several ways of conceiving action, being, and state. Usually, although children have been comprehending and speaking their mother-tongue for many years before this definition is reached in school, they have reflected so little upon their own speech that they are ignorant of the existence of several modes. It would require considerable time to reach back into their experiences and collect enough instances in which action, being, and state have been differently conceived, to convince them that this definition pertained to their own lives or had any worth for them. Consequently, when they learn it first, they get empty words and not a thought. — The same thing is true in *geography* when definitions of mountain, plateau, etc., are given before particular mountains, plateaus, etc., have been studied. The emphasis now laid upon home geography is partly caused by belief in inductive work. One cannot always visit a mountain, plateau, etc., but he can study one or several of these objects in detail before receiving a definition of the same.—No time is saved by presenting the rule for division of fractions, or the definition of specific gravity, before numerous concrete examples have been carefully examined. In all cases, whatever labor and time are spent in pretending to understand what one does not and, from the nature of the case, cannot understand, are entirely lost.

Also danger of distaste for subject.

But there is more than a loss of labor and time in giving the generalization first, for children are thereby forced to approach a subject from the least attractive side. They are called upon to master the words for a thought that is not expected to be understood till later. Just as it is injudicious for men and women to present their least agreeable side to strangers, so it is unpedagogical to introduce children to topics in a way that least appeals to their past experiences and interests. When the rule is placed in front they are necessarily reminded of their weakness rather than of their strength, and an unfriendly feeling is engendered toward the subject in hand. Consequently not only are labor and time lost, but children are repelled by such instruction.

An apparent exception explained.

But many eminent men have been educated in just this way, and it often happens that general truths are immediately comprehended on presentation. Is it entirely in vain, therefore, that rules are offered directly, with the hope of abridging the process of acquiring knowledge?

If it be true, as was asserted, that generalizations arise in only a single way, that they have their origin solely in individual notions, then there is only one possible way of approaching them. The fact that they are at times fully understood as soon as heard, is no exception to this rule. In such cases past life has happened to furnish enough individual experiences, and these are sufficiently present in consciousness to give a meaning to the words that are heard. The reason that the words are comprehended is that the truth has already been reached inductively, and it is now simply being worded. Now and then, too, where past experience bears apparently little relation to some general statement, a person shows strange power to reproduce and mass data that can explain it. But that is the privilege of only an unusually quick mind, and is no exception to the psychological law. Even in such cases, unless the supposed generalizations are merely reviews or applications of truths developed in the past, they are still in reality approached inductively: the words are empty, or carry only a doubtful meaning, until facts are called to mind which form a basis for drawing the desired conclusion; light is then shed upon them, or they are given a content. The statement of the general truth first is, therefore, merely a *challenge* to hunt up the data that prove the truth. With trained adults acquainted with the subject, and with very bright minds, the challenge is received joyfully, and activity follows that results in clear insight.

But that does not happen in ordinary instruction. Usually the generalizations that the school should teach are too far in advance of the child's or youth's knowledge to be understood at a glance; or even if his past experience actually contains all of the concrete facts required, they are so scattered and so far removed from consciousness when needed that they are practically wanting. Then this pleasant challenge is converted into a disagreeable command; it is a circumlocution in method that causes loss of time and destruction of interest.

The conclusion is therefore reached, that the only wise course is to bring together or present concrete notions in advance of the rules which they would teach. Accordingly, the statement of the rule for addition of fractions should follow the solution of several examples involving addition; the law for the metamorphosis of insects should follow the study in detail of one or more types of insects; likewise the definition of trade-centre, the underlying truth in the Golden Touch, and the proverb in regard to unity should all come after the concrete data. The second presentation of each of these general truths, as outlined in Chapter II, illustrates how this might be planned.

Outline of method.

With this important conclusion established, it is possible to distinguish the outline of method. There are three great topics to be kept in mind; namely, individual notions, general notions, and the application of general notions. There are no others, because these three cover the entire circuit; there is no part of instruction that can fall outside of them.

From what has immediately preceded, these three topics must be treated in the order mentioned; *i.e.* first, individual notions must be taught, then progress should be made from the individuals to the generals, then these latter should be applied. This necessary order constitutes the first great law of method.

And since all mistakes in method of teaching can be made only in one of these three fields, there are naturally three leading questions in method: —

1. How should individual notions be acquired?

2. How should progress be made from individual to general notions?

3. How should general notions be applied?

If there is a necessary way of acquiring individual notions, and also of passing from individuals to generals, then, besides the great law of method already mentioned, *i.e.* induction, other laws may be established which will prove of great value.

It is our next duty to discuss the first of these three questions. And as the acquisition of individual notions requires the consideration of a large number of topics, the problem will be divided into two parts or chapters: first, how individual notions should be *prepared for or approached;* second, how they should be *presented.*

CHAPTER VI

HOW INDIVIDUAL NOTIONS SHOULD BE APPROACHED

Abundance of early sense experience.

We have already discussed the nature of individual notions in distinguishing them from general notions, and have seen that they are identical with *percepts* or *concrete notions*. A large number of such notions are acquired during the first years of life by direct contact with individual things. Children see, handle, taste, smell, etc., and thus receive their first impressions. They also perceive individual events and relationships. The birds in their neighborhood build their nests and rear their young; their favorite trees blossom and bear fruit; the seeds of certain flowers are found to be transported in all directions by the wind and often by animals; the cold weather causes the village pond to freeze over, and certain vessels containing water to burst. The intercourse of men with one another is likewise noted; one speaks angrily with another; two are observed to be united by the bond of friendship; some perform many kind acts, while others seem to be guided by certain ignoble motives, etc. All such things and many more are perceived, and leave impressions called individual notions.

This process of learning by direct experience continues throughout life. But if a person is left entirely to himself in acquiring knowledge, he is likely to make serious mistakes in even the simplest observations, and to be very superficial. One sees birds daily, but it is rarely the case that he can describe common birds accurately; favorite shade trees that line our streets, as the elm and the maple, are scarcely seen, although we almost touch them every day; few can tell when they bear flowers and seeds, or whether they bear them at all, or not. Many persons cannot even tell the color of the eyes of their friends and daily companions. Carelessness in the observation of common events is just as striking: we fail to note the direction of the wind and the habits of animals; few can tell how a cow lies down or how a horse gets up. This inability to see correctly, or to see at all, is shown in a practical way in the courtroom by the failure of eye-witnesses of objects and events to agree as to what was seen.

Extent of error in such sense experience.

It is the mission of the school, so far as it can, to correct and widen such observation. But there are many individual objects of study that cannot be brought before the senses of children, and instruction must deal with these also as best it can. For example, many geographical and historical objects which are distant in place or time still need to be sharply grasped by the children. Famous scenes in history, interesting and picturesque places in geography, need

How the school supplements this experience.

to be presented definitely to the mind. Pictures, drawings, famous paintings, photographic views of notable buildings, churches, monuments, etc., are indispensable for giving correct notions of individual things. The teacher may also use diagrams, and simple plans and sketches on the blackboard, not only to explain forts, cities, battles, journeys, campaigns, voyages, etc., but also to make plain particular processes in the industries, machines, and inventions, devices for overcoming difficulties, experiments in natural science, the movements of planets in the solar system, and many similar particulars. The children also should use these same graphic means of expressing their thought, and thus become more clearly acquainted with the facts.

Even in natural science, which is primarily a study of things present to the senses, there are many objects and particulars, at home and abroad, which can best be shown by skilful devices and graphic diagram: such as the circulation of the blood, life processes in plant and animal, chemical and physical changes and forces, microscopic life and changes as touched upon in grammar grades, geological strata, mathematical geography, and many other examples in science. A large portion of the time given to elementary branches must be devoted to the study of these objects of sense, either present or absent.

Defects in this instruction.

But it is evident that instruction which deals with these distant objects is subject to even more frequent errors than is the study of objects present to the senses. The first great source of error, therefore, is found in the faultiness of this original raw material of knowledge, the sense-percepts.

Why the teacher must regard words with suspicion.

The second and perhaps still more troublesome source of error is found in the *language* with which we try to express or convey knowledge. Language is indispensable to thought, and yet when carelessly used it is a prolific source of confusion. For words are but the arbitrary symbols of knowledge and in themselves mean nothing. The words that we see or hear sometimes mean little or nothing to us, sometimes they suggest a wrong notion or one different from that intended by the speaker or writer. Seldom does a word mean exactly the same to two different persons. And yet, since not only the geographical and historical events, but even the objects studied, cannot usually be present to the senses, instruction must depend mainly upon these faulty instruments to build up new and correct mental images. What a wide door is here opened for misconception and error in the use of language!

Now instead of sharply noticing the sources of error in the use of words and of pressing back of them to the original objects and facts themselves, teachers have often made the surprising mistake of thinking that bare words have a peculiar power for directly conveying knowledge, that a mere word is the equivalent of an idea, and that verbal descriptions of objects and events can build up in children's minds vivid and correct mental pictures. This view of teaching made instruction an apparently simple and easy matter. Any one could teach who could govern a school, who possessed the necessary knowledge, and who had a good command of language.

But the modern understanding declares teaching to be by no means so easy or mechanical; there are several important conditions to be fulfilled before facts communicated by words can result in real knowledge, and it is the observance of these that makes teaching a difficult process.

Proof from Rousseau's experience.

One of these conditions that is essential is suggested by a story that Rousseau relates in his "Emile." He had accepted an invitation to spend a few days at the country home of a woman of rank who was much interested in the education of her children, and he happened one morning to be present in a history recitation conducted by a private tutor with the eldest boy. The topic under discussion was the well-known story of Alexander and his physician, Philip. It was related how the former was warned by friends that Philip was untrue to him and was awaiting an opportunity to give him poison; and that, nevertheless, when in need of medicine, Alexander took the proffered goblet and drank its contents without hesitation. At dinner the child was called upon to relate the narrative, and did so amidst much applause. There then followed some discussion of its merits. The majority of the guests present agreed that Alexander was very rash, while some, among whom were the tutor and the boy, greatly admired his bravery. This was enough to convince Rousseau that none of them had a proper appreciation of the real greatness of Alexander's act. It was to him first of all a profession of faith in mankind. Alexander believed in human virtue; he had faith in his friends, even to the extent of putting his life in their hands.

But the great educator was particularly interested in the interpretation which the boy might put upon the story; accordingly, at the first opportunity after dinner, the two took a stroll together through the park. Rousseau had already come to suspect, from several signs, that the boy had no correct comprehension of the story which he had related so beautifully. He therefore questioned him at his ease and found that he, more even than his instructor or any of the guests, was an admirer of the courage that Alexander had displayed. "But," proceeds Rousseau, "do you know wherein he saw this courage? Solely in the act of swallowing a bitter-tasting potion without hesitation and without showing the least repugnance. The poor child who, less than two weeks before, had been required to take some medicine and had found it extremely difficult, had still the after-taste of medicine in his mouth. To him death and poisoning meant only disagreeable sensations, and he could conceive of no poison more disagreeable than his own drug. However, I must confess that the courage of this hero had made a deep impression upon his young mind, and he had firmly resolved to be brave like Alexander the next time it might be necessary for him to swallow such a draught."

Here we have a simple narrative interpreted in four different ways, and it is easy to determine the cause. The taking of medicine being an important incident in the anecdote, and the boy's experiences along this line being recent and vivid, he made out its meaning through their help. The tutor, also, saw bravery in Alexander's act, but of a different, more soldier-like quality.

The majority of the guests considered Alexander very rash, because they called to mind, in interpreting the deed, past experiences that were only superficially related to it, while Rousseau, being a man who had learned to appreciate the beautiful and noble, had apperceiving feelings which led him to class this among the noblest acts of man. This is proof that the mere recital of words gives no guarantee of a correct interpretation. Further than that, we see that it is the past that conditions the present; it is our past ideas, feelings, habits, etc., that interpret the new experiences which are offered us. This fact is seen in the varying impressions that the members of an audience carry away from a lecture

The most important principle of teaching here suggested.

which all have had an equal opportunity to hear. It is seldom that a simple announcement to the several hundred students in a normal school is understood in the same way by all present. In such cases the difference in interpretation cannot be due to a difference in what is heard, for all hear exactly the same words; it must be due, therefore, to differences in those that listen; according to the thoughts that are uppermost in their minds they get meaning from the words that are uttered. It is clear, then, that we "proceed from the known to the unknown" in learning, or that we "get out of a thing what we put into it." This is probably the most important of all the principles of teaching, and is commonly called the *principle of apperception.*

There are two considerations which must be continually kept in mind if this great law shall be successfully applied by the teacher:—

First condition of proper application of principle of apperception.

First, any *new knowledge* offered to a child *must be met by old ideas closely related to it* if it is to be well comprehended and appreciated. A child who has been blind from birth, and whose sole means of discovering the presence and quality of objects is through the sense of touch, cannot comprehend how an ordinary person can know that there is a horse down the street; it is necessary for the blind child to go and place his hands upon the animal to determine where and what it is. Also, having no appreciation of color, he is unable to distinguish what things have that characteristic, or to see anything inappropriate in the question, What is the color of the days of the week? One child to whom this query was put, very naturally replied that they were probably blue, for he had heard people speak of "blue Monday"; another likened red to the sound of a trumpet. Thus the absence of a certain class of experiences prevents the possibility of interpreting ideas belonging to that class.

The majority of men would learn almost as little from a lecture on calculus as the blind boy from one on color. But as things begin to come within our range of knowledge and interests, they begin to carry meaning. The wild Indian on the western plains would appreciate the sight of a man climbing a telegraph pole in modern fashion, for he does enough climbing himself to realize that it is no easy task to go up a smooth pole. Still, there is such a wide chasm between his daily thoughts and most modern inventions, that he would be unlikely to have much regard for a steam-engine. The schoolboy who reads about the threefold division of society in European countries is confronted by much the same difficulty; his environment being usually his sole source of help, he attempts to divide his own little community into three strata, according to the description. In this country the attempt necessarily meets with failure, and consequently the thought has little force. Thus, in applying the law that new knowledge can be acquired solely through the old, it must be remembered that the relationship between the new and the old must be very close, if the former is to be well comprehended and appreciated.

A second condition.

The second consideration is just as important as the first in influencing the method of teaching; it is that *any one must be fully conscious of this close connection* between the known and that which is yet to be learned. If this consciousness is lacking, the two are practically disconnected, no matter how close their real kinship may be. We often meet old friends and regard them as strangers, and this happened so regularly in the schoolroom that it would be difficult to accomplish it more certainly.

For instance, children are not expected to distinguish the *grammatical subject and predicate* of sentences before the eleventh year of age. But they have been speaking English nine or ten years, and understanding it fully as long. Of course, then, they know "what they are speaking about" when they utter their thoughts, and they know well, too, what they say about their topics of conversation. They understand their mothers and their friends just as well as themselves. Any child, then, has had daily practice for ten years in distinguishing "subject" and "predicate," and has become quite an adept at it before he is required to study such matter in school. What teachers need to do is to remind him of this abundant experience and show him that, while he knows a great deal about this topic, there are many things yet to learn; he is then ready for work. But, alas! What is usually done? Without reference to the past, words are repeated and drilled upon until children are fully convinced that subjects and predicates are far from their daily needs, and in despair they declare prepositions, adjectives, conjunctions, etc., to be subject or predicate, according as they think they can best please their instructors. *Mode* is surrounded with the same strange atmosphere. In spite of the fact that children are actually using all of the modes continually; in spite of the fact that they have already been introduced to two of them in the primary; namely, the indicative and imperative, under the guise of *telling* and *commanding* sentences; and in spite of the fact that they are already acquainted with both words, *mode* and *mood* (as in fashion journals, "mode" of doing this and that, "pleasant mood," etc.), the topic is so taught that both the words and ideas seem never to have been heard before, or to have no bearing upon daily living.

Many a teacher of Homer or Virgil confuses his pupils for weeks by talk about scansion, quantity, feet, and accent. High school students may become fully lost in such work, notwithstanding the fact that, even as babes, they greatly enjoyed the rhythm of

Mother Goose, and the regularity of accent found later in poetry for children. If high school professors would only establish the conviction in the minds of their students that this subject of scansion is a very familiar one, and even that a principal difficulty in reading in the primary grades is the tendency to scan or sing the poetry read, this whole subject would be greatly simplified.

It is strange how topics that have been thoroughly and even easily mastered in one study may appear difficult when broached in a very different study. The matter of *exponents* is an example in point. In arithmetic, without any special effort, children comprehend that the square of two, multiplied by the cube of two, equals the fifth power of two, and that the cube of three, multiplied by the cube of three, equals the sixth power of three. It could not be otherwise. Examples are frequently given by the teacher bearing upon this point, and seldom or never do pupils trip upon it. But how different in algebra! Exponents are there the bane of the student. In spite of the fact that high school classes are drilled continually upon the rules pertaining to this subject, and are given abundant practice in application, from my own experience in examining twenty-five high schools in Illinois three out of five students will declare that the square of A, multiplied by the cube of A, equals the sixth power of A. What a quantity of effort might be saved if, in approaching this topic the first time, the related facts in arithmetic were called to mind and made the basis for the study of exponents.

The fact should be emphasized that, though children are familiar with a certain object and have seen it often, yet if they believe the contrary, the contrary might as well be true, so far as the acquisition of knowledge is concerned. For instance, I once knew of a room of forty fourth-grade and fifth-grade children in which nearly all asserted that they had never seen a *valley.* Of course, under those circumstances, they could not be expected to feel at home in the study of valleys. Yet it was soon discovered that every child had travelled upon the railroad; that he remembered having crossed several bridges; that water was seen underneath. There was even a small stream in that town which the children had often crossed on a bridge. Of course, then, they had seen valleys; and those which they had seen should certainly have formed the introduction to the discussion of this subject.

Feelings also interpreted by similar feelings.

The principle here involved applies as much to the appreciation of *feelings* as to the appreciation of ideas. Take, for example, the first three stanzas of Gray's "Elegy in a Country Churchyard": —

"The curfew tolls the knell of parting day;
The lowing herd wind slowly o'er the lea;
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me.

"Now fades the glimmering landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight,
And drowsy tinklings lull the distant folds;

"Save that from yonder ivy-mantled tower
The moping owl does to the moon complain
Of such as, wandering near her secret bower,
Molest her ancient, solitary reign."

The thought here is so simple that it can be easily comprehended and still leave little trace of itself in the minds or hearts of pupils. This poetry is first of all an appeal to the emotions, and certain past *feelings* must be present in consciousness before it can be properly appreciated. As one recalls his pensive attitude on some well-remembered summer evening when, in the gloaming, he observed the cattle and the workmen winding their ways homeward, when darkness gradually shut away the outer world and produced a feeling of loneliness, when the noisy world grew quiet and only the buzzing of insects and the tinkling of bells could be occasionally heard, then, as these pictures and the accompanying feelings are vividly reproduced, is one in the right frame of mind for such a poem. Boys and girls must recall definite times in their lives when they enjoyed such reflections as these, and their feelings on those occasions must be reproduced before they will be able to enter into the spirit of these stanzas.

This poem is a type of many subjects of instruction. In Sunday-school work, in prose literature, in history, in nature study, and in art, real appreciation often involves much more than the mere comprehension of the facts or statements; new feelings are to be aroused, and in that case the past related emotions should be recalled and renewed before a proper means for arousing new emotions can be considered to be at hand. We state the same general thought in other words when we say that feelings or moods are a great factor in education. The business man appreciates them. Like the teacher, he is attempting to influence customers by the ideas he presents, and, if he is skilful, he is very careful to broach a matter "at the proper time," *i.e.* when his listener is in the mood for it. If the right mood is not present, he postpones his business discussion until a more fitting time, or seeks to bring it about by introducing other topics of conversation for a period.

The child recognizes the same important principles of action in dealing with his parents. Even the infant is often too wise to ask a favor abruptly of his mother if he suspects it is likely to be refused; he cajoles her rather, until he thinks she is in the humor to grant his request, then he presents it. Children in school often exhibit the same tact toward their teachers; they study the latter closely and vary their words and conduct according to the mood that prevails at the time. If instinct teaches business men and children to regard moods as highly important in all attempts to influence other people, why should not teachers obey the same impulse and be at least as pedagogical as these uninitiated ones? If they did so, they would feel their way cautiously into many a subject where now they rush upon it abruptly.

From the preceding facts it follows that new feelings are dependent upon old feelings for interpretation and appreciation, just as new facts upon old ones: the law of going from the known to the unknown is evidently capable of wide application. There are *two factors* to be kept in mind in its application: not only must there be old knowledge and emotions closely related to the new, but the learner must be conscious of this close relationship.

The two great facts just mentioned suggest some important conclusions: —

Conclusions suggested by principle of apperception.

1. Good teaching deals primarily with ideas and feelings rather than with words, and it consists in *fitting* or *dovetailing* new thoughts and emotions with those already in the pupil's possession; it is a process of *adjusting* the new to the old; and the extent to which a close adjustment is secured determines the effectiveness of the instruction imparted. Real skill is required to do this; hence teaching is not a merely mechanical work that any one can do. Not every one can teach; even those who know the subject-matter of instruction thoroughly may make an utter failure of it. In order to fit new knowledge to what the child already knows, it is necessary not

only to be acquainted with the facts to be offered, but also with the child to whom they are to be offered; the latter is a more difficult task, yet the pupil must be thoroughly understood before deftness can be shown in the matching process.

But while teaching is difficult, there is comfort in the fact that it is a kind of work in which skill can be acquired. It is not true that "teachers are born, not made." The average person can become, or be made, a teacher, provided he will study the child and the laws of influencing him with the same care that he studies the subjects to be offered.

2. *Words have no magic power;* they are a subordinate instrument in the acquisition of knowledge, being mere symbols by which experiences are called to mind. If these latter are wanting, there is no effect. The eloquence of Cicero could not explain to a deaf man what music is, or to a blind man what scarlet is, if the defect in hearing or sight dated from birth.

Even the fact that pupils remember the words of the teacher, or of the book, and can repeat them promptly, gives no sufficient proof of knowledge; it gives proof only of a good verbal memory. Very often the ability to reproduce exact words of definitions, etc., is only a cloak or mask behind which ignorance is concealed. For instance, exceedingly few English speaking people ever reach any real appreciation of *case* in grammar, although they can give the definition and some examples very readily. Few teachers of *case* ever have any warm feeling for that subject, which is evidence that they have not yet made it their own. Much *verbatim* memorizing is merely practice in unconscious deception, for thereby both teachers and students are persuaded that knowledge is acquired, when, in fact, it is only the symbols for ideas rather than the ideas them selves that are mastered.

3. The *mind is not a passive recipient of knowledge*, like a vessel for water, or a storehouse for grain. It is active in choosing; it applies the severe test of kinship to all that is presented to it, ignoring whatever seems foreign, and giving a warm reception to whatever appears closely related to its needs.

The past is, therefore, the foundation for all future learning. This is true of any kind of knowledge, and applies fully to the acquisition of individual notions. There is no short cut to learning by merely "handing over" ideas from one person to another; whatever is received is accepted solely on the condition that it find a foundation suited to it; all else is discarded.

Meaning of "preparatory step."

It is the *first duty* of the teacher, then, to direct attention to the past related experiences. The architect provides first for the foundation of his building, and the stronger the superstructure is to be, the deeper he digs into the earth for the base.

This takes time and costs much money, but it is manifest folly to omit it. The same is true of the instructor; the sole condition under which a sure reception can be found for what he offers, is that he direct attention very carefully to the old ideas as the groundwork.

This first duty, or *first step*, in the series of movements for the mastery of a generalization is well called the *step of preparation* (of the learner's mind), and the need of it explains the reason for the peculiar title of the present chapter.

Serious risks in neglecting this step.

In ordinary practice this part of method is omitted. For instance, in beginning England, in a geography lesson, no time is occupied solely with recalling, collecting, and arranging old ideas as a foundation upon which the new must rest; it is rather the custom to plunge into the new immediately. Even in literature, where the new selection is often introduced with remarks about the author, about characters in the play, etc., this step is largely overlooked. But, if children are fairly well prepared for the studies which they are perusing, many related ideas will spring up of their own accord, whenever any topic is presented. Why, then, occupy time in recalling thoughts of the past, when they are likely to come without it?

The reasons are the following: —

(1) *First*, there is the danger of *no understanding* of the subject presented. For instance, many a child

has committed to memory the poem "Excelsior," wondering the while what it meant. The subject of scansion, already referred to, is another example of the same kind. Percentage is still another. Children are often mystified by the fact that, while there are so many fractions, those of a certain denomination called hundredths are singled out and greatly emphasized. The text-book, too, increases their perplexity by introducing the subject in a new chapter, as though it were quite different from what had preceded. As a result, they feel strangers to percentage and sometimes fail to find their bearings for a long period.

Second, there is the danger that, even if children understand the ideas presented, they may feel *indifference* toward them. This is perhaps a more serious danger than the preceding. "Gray's Elegy," already referred to, furnishes an example. That poem is frequently finished before it is begun. That is, every stanza is understood by the child, and it is laid aside as completed work, without his ever having begun to enter into its spirit. Likewise, civil government, English grammar, and beginning Latin are often taught and finished without any good effect further than the possession of a certain quantity of knowledge. This is not true teaching. To the true teacher the child's *sympathy* with the subject-matter taught is an absolutely necessary condition for success. The pupil should always be able to give a satisfactory answer to the question, "What is this subject to me?" A genuine glow of feeling must accompany facts that are to prove of permanent worth.

A universal law is here involved. Though one come to understand a subject fairly well, he may fail entirely to appreciate it sympathetically; but unless knowledge is really appreciated, it is not permanently valuable. In time past the great majority of teachers have acted as though the possession of knowledge and its appreciation were identical. The Sunday-school teacher, for instance, has taken for granted that, if she could impart a few Bible facts to her class, the children would be made more religious. Likewise, Shakespeare's dramas have been often taught with the presupposition on the part of the instructor that, if each word and each sentence were clearly comprehended, a love for Shakespeare and for literature would be engendered. There are few errors more serious. While one is learning to comprehend the Bible, or literary productions, or history, etc., an unfriendly feeling may be growing up which may result in dislike of the subject. And this is the feeling that is being aroused towards many subjects that are fairly well comprehended. That attitude of mind precludes the possibility of good. Both Froebel and Herbart, the two great educators of this century, urge the necessity of *interest* in the studies taught, and the importance of the development of tastes. If they are right, interest must be substituted for indifference or aversion. It can be developed through the establishment of a feeling of kinship each time for what is offered. And since this feeling of kinship is dependent, as has already been shown, upon consciousness of the close relation between the old ideas and those newly offered, it can be aroused by careful attention to past related experience. A few examples will make this matter clear.

Let it be the aim of a recitation to study the most beautiful part of the Rhine River. If, without any preparatory step, we begin a description of the Rhine itself, serious difficulties may easily arise. The conversation soon turns to valleys and beautiful views; it is this valley that is so beautiful. But children often do not remember having seen a valley, or, if they do, they recall nothing about it especially attractive. This may be true of teachers as well as of children. I was once instructor in a county institute where eighty teachers were present. Seventy of them declared that they could not recall ever having enjoyed a beautiful view. But the fact was that in the town where the institute was held there were several beautiful views, one of the principal avenues being entirely arched over with elms. Of course in both cases they had all seen the object talked about, and not being made conscious of the fact, they had nothing to build upon. They felt no kinship for the subject in hand, and hence a discussion of it could not appeal to them. As far as the Rhine River is concerned, most of those who are prepared for its study, both children and teachers, have not only seen valleys and streams and beautiful views, but they have heard of Bishop Hatto and the Mouse Tower, Bingen on the Rhine, the Lorelei, and perhaps they have even read "Seven Little Sisters." If these ideas were all called up as an introduction to the Rhine, they would create a feeling of kinship which would mean a live interest from the beginning.

Again, suppose that we are to study that country in Europe in which William Tell is said to have lived. If the advance work is begun immediately, even though it can be comprehended fairly well, there is serious danger of comparative indifference on the part of pupils. But this danger is easily overcome by recalling what one has heard or read about avalanches and snow storms among the Alps, about Tell and other adventures, St. Bernard dogs, Swiss lakes and scenery, the experiences of Jeannette in "Seven Little Sisters," etc.

The *third* danger threatened by the omission of this preparatory step is that the *subject* under consideration *may be only partially understood, or even misunderstood.* Rousseau's story, related above, is a good illustration. It is not an uncommon occurrence for auditors of a lecture to contradict one another flatly as to the purport of the lecturer's thoughts. People approach whatever is offered them with the interests, preconceptions, prejudices, etc., that are peculiar to them. Each one, viewing what is presented from his own point of view, naturally puts his individual interpretation upon it. It is necessary, then, that misunderstandings arise; and school examination papers prove that they arise in abundance. Very few students are so accurate in all their observations and thinking that their past conceptions are a correct basis from which to interpret new ideas, and yet past experiences are the sole means for such interpretation. Therefore, it is plainly advisable for the teacher, in order to avoid mistakes, to call up, examine, and, when necessary, correct past related experiences before advancing into new subject-matter.

From this discussion it follows that there is danger at all times of poor instruction, when a distinct period is not set aside for preparing the child's mind to receive the new knowledge that is offered. There may be either no understanding of the subject in hand, an indifference or aversion toward it, or a misunderstanding of it. The only safe course to follow is to anticipate such difficulties by careful preparation.

Many teachers, no doubt, would agree to the statements up to this point, but would object to this conclusion. Instead of anticipating such difficulties, they would plunge into the new subject-matter

But why not, at least, delay consideration of past related experiences until it has been found necessary?

immediately; then if any of the evils mentioned manifested themselves, they would correct them by turning back and recalling the necessary past experiences. This is the usual plan followed, and it is popular because it seems to save much time.

But if related past experiences are to be called to mind at all, no time is saved by doing it late rather than early. Also, if such experiences are the sole basis for new knowledge, — as has been shown, — the latter has nothing on which to rest, until the former are present in consciousness. Consequently time is lost by the omission of the preparatory step. However, there is more than a loss of time involved. If children read "Excelsior" without interpreting it through many old and familiar thoughts, *i.e.* without interpreting it at all, they have not only sacrificed their time, but they have lost some of their zest for study. That kind of instruction dulls mental life and ambition. The injury is of the same nature if the given topic, as Gray's "Elegy," is comprehended, but is pursued with indifference or dislike. Finally, the situation is not improved when the subject taught is misunderstood, so that corrections are necessary. In each of these three cases the *first impressions* received are either unfavorable or wrong; they must be erased and the work attempted again in a better way before good can result.

Men and women in their contact with one another learned long ago the supreme importance of favorable and correct *first impressions*, and they consequently approach one another with the greatest care. When one man conceives a prejudice against another at their first meeting, a strong barrier to their friendship is surely raised. The proverb that "first impressions are most lasting" is accepted as a grave truth by the world of society and business, and teachers have abundant reason for reaching the same conviction. The child who has gotten linear, square, and cubic measure well confused in his mind, is apt to be permanently weak on that topic. The high school student who has decided that he cannot understand specific gravity, is not likely ever to understand it fully. It may not be difficult to rescue such persons from their state of ignorance for a time, but the difficulty consists in making the rescue permanent. All these facts being so well established, it is astonishing how willingly teachers fairly tumble into subjects, leaving first impressions to mere accident. It is true that "it is easy to tear down," but the truth applies to the corrections that one attempts to make, and not so much to the first impressions themselves. Progressive teachers are rightly throwing great emphasis upon a cautious approach to all topics of study.

We have reached the two conclusions that new knowledge is interpreted through the old, and that, in order that this interpretation may be correct and effective, it is necessary to recall, collect, and arrange the past experiences bearing upon the topic under treatment. The dangers threatened by the omission of this step are so serious that it must constitute a part of the regular instruction. Now, in planning it, there are a few considerations that should have much weight:—

Precaution in regard to the preparatory step.

First, the teacher should endeavor to call up *as many related ideas as possible*, especially those which are closely welded to the personality of the child. These latter are the strongest apperceiving notions. Being the ones that are most vivid and active, they can best establish a feeling of kinship toward what is studied.

It is surprising how little value book knowledge may possess for this purpose. One may have read or committed to memory a vast number of facts and still be stupid in his capacity for receiving or apperceiving new thoughts through them. Ordinarily experiences that have occurred outside of the schoolroom are a surer apperceiving basis than those within the schoolroom — a proof that much school instruction is radically wrong. Arithmetic illustrates this truth. Although that branch is studied so much, the subject-matter is so taught that it often fails to become welded to the personality of the child, and hence it cannot act as a firm apperceiving basis for the comprehension and solution of the ordinary arithmetical problems that life presents.

Even knowledge drilled into pupils at school by frequent repetition may give very little apperceiving power. The reason for this can be easily seen by recalling the definition of teaching; namely, the careful fitting of new thoughts to past experiences. Frequent drill upon a point, or constant verbatim repetition, makes no provision for this process of fitting some ideas to others. Such repetition is based upon a different conception of teaching; namely, that the connection between the old and the new, if necessary, is established by mere force, by frequent pounding. But daily repetition of the Lord's Prayer, while it familiarizes us thoroughly with a certain order of words, does not necessarily bring the meaning of the prayer any nearer to us. Many a man would be greatly surprised if his attention were called to the real significance of the first words, "Our Father," for he has never stopped to reflect upon them. The teacher, therefore, in planning for full apperception, cannot expect to find strong support in many of those subjects which have been verbally memorized and frequently repeated. Her strongest support will be found usually in the home experiences of the pupil, in the occupation of the parents, in the subjects of conversation among them and the children, in the games among the latter, in books of travel, and in fact in any books that children have read of their own accord. All of these furnish ideas which become so thoroughly a part of the child's life that they are the surest foundation upon which new knowledge may rest.

It is evident that success in this step of instruction involves an extensive knowledge of the child's home relations and of his individual nature; that is, his preferences, peculiarities, and feelings. From among these home experiences, and those of the school also, in as far as the instruction there has been good, many facts should be drawn which bear directly upon the advance instruction to be given. By calling up as many vivid experiences as possible, the feeling of relationship to the topic in advance will be closer, and therefore the teaching will prove more effective. For instance, children will be attracted to England after they recall facts such as the following: that the Pilgrim Fathers, John Smith, William Penn, came from England; that Charles Dickens, the author of so many good stories, lived there; that sometimes their pocket knives, and very often the table knives, have "Sheffield" marked upon them; that many of our names are English, with *New* prefixed, as New England, New York, New Jersey, New Hampshire, New Bedford; that some in the class have relatives or friends who have visited that country, and who have related certain incidents, etc. That is the skilful teacher who can designate beforehand just how many things each child has known pertaining to a given subject, so that in a few minutes they may all be recalled.

The *second* precaution to be taken is, that *no advance work should be attempted during this preparatory step*. One cannot well prepare for new knowledge by presenting what is new, just as he cannot erect a building while laying the foundation. There is always a temptation to move forward, and to offer new thoughts in the midst of the discussion of old ones. But the kind of mental activity required in this preparatory step is different from that required in the advance. In the case of England just referred to, the recalling of such thoughts taxes the memory rather than the ability to comprehend. One is called upon to survey his experiences in order to choose out those which bear upon a given subject. That kind of work must be done by itself. If, in the midst of it, new facts are frequently offered, they are a serious interruption.—Further than this, there would be danger that the new and the old may become somewhat mixed in passing frequently from the one to the other. For instance, if children were collecting all the facts they knew about London, and the teacher were to allow some advance instruction in the midst of this work, there would be a temptation on her part to handle this latter as briefly as the former. Review points are naturally covered more rapidly than advance, and there would be a tendency to the same rate of speed in the latter. It is always important for both teachers and pupils to know definitely whether they are reviewing or advancing, because only in that case do they exercise a proper amount of caution in regard to speed.

Another object of this separation is to fix clearly the limits of the pupils' knowledge upon the topic in hand. Whenever one sees definitely where his knowledge leaves off, a feeling of need arises, an appetite is generated for more; that is, a receptive frame of mind is produced, and one knows where new instruction should begin. It is a serious fault with people that they are not sufficiently aware of what they know, and of what they do not know. The limits between the two are so hidden that often, although they know little they take it for granted that they know much. In consequence, they do not feel a need for instruction; or the feeling of need, if present, is not specific, and hence it is difficult to know where to begin. No educator has ever been so keen as Socrates in appreciating the importance of fixing the exact limits of a pupil's knowledge as the condition under which he will be in a receptive frame of mind; but the teacher also is benefited by knowing this limit for he knows then where his instruction ought to commence — a very important matter.

Queries will often arise while pupils are recalling their knowledge about a certain matter, and they will often even fall into friendly *disputes* over it. For example, a room full of fourth-grade children in Chicago once became excited in discussing how the water reached the city from the lake, and what was the purpose of the water tower and engine. The chief result of the recitation consisted in the discovery, both on the part of the teacher and the children, that the latter did not know the things which they had supposed they knew, and the disputes that arose gave point to several advance lessons which were in prospect. The children were anxious to find out who were right in the sides taken, and these recitations were looked forward to as the answers to the problems presented. Such disputes, therefore, are decidedly welcome.

More than that, children may often run forward in thought and *anticipate* facts which will be presented later. That is quite desirable. Some anticipation of what is coming is one of the surest signs of good teaching, for it proves that children are in the spirit of the instruction given. Whether their expectations are realized or not makes little difference. Their minds are on the alert, and the outcome will be awaited with interest. Thus lasting impressions are assured.

The *third* precaution in this step is fully as important as either of the other two and, in fact, conditions the success of both; it requires the *statement of the aim.*

The attention of pupils must be centred quickly and fully on the work undertaken. They enter the class room with scattered thoughts, or occupied with the subject-matter of the recitation immediately preceding. Unless skill is manifested by the instructor in calling up the ideas that are desirable and in excluding all others, the recitation is lame from the beginning. Commands will not accomplish this object. Even adults possess little ability through mere action of will alone to rivet their attention upon a certain topic to the exclusion of all else. Much less do children have this power. At the best the latter are able through the force of will to turn their attention to a given object for only a moment. If, then, the subject-matter itself does not continue to attract them, their thoughts quickly wander. But much teaching fails to secure this initial act of the will. Even though children sit bolt upright and direct their eyes to the teacher, their minds, like those of adults in listening to sermons, are often filled with matters wholly irrelevant to the topic immediately under discussion. Only as the recitation proceeds is the attention of one child after another caught and held by the facts presented, and only during the latter part of the hour is much momentum of thought attained. It would certainly be a great gain if closer attention and greater speed in thinking could be secured earlier, or even at the beginning of the recitation period. A proper statement of the aim of the recitation, worded from the children's point of view, can do much toward the accomplishment of this purpose. In acquiring knowledge, as in other occupations, the degree of attention given and the quantity of effort put forth are much influenced by the clearness and zest with which the aim is conceived

It is taken for granted that the teacher has a definite object in view in each recitation; the contention now is that the pupils also shall aim at something definite. The preparatory step which has been discussed requires that they select all facts in their possession that bear on a given topic, and reject all else. They must do most of this work themselves; the teacher can merely offer them suggestions. But unless they know in some way what the recitation is aiming to accomplish, they are ignorant as to what they should search for out of their past experience; of course, then, they are helpless and must be led along blindly.

Characteristics of pupils' aim.

A properly stated aim must fulfil several important requirements. In the *first* place, it must be *concrete and not abstract.* Enough has been said about abstractions or generalizations in previous chapters to show that they follow rather than precede individual notions. They are empty and repellent until one has the concrete data upon which they depend. Consequently, the children should not be told that a recitation is aiming to explain some general truth.— However, this does not signify by any means that the teacher shall have no such aim in her own mind. As has been already stated, instruction culminates in generalizations, and the teacher must keep these in mind; but her purpose is a thing entirely separate from the aim which should be stated before the children.

A Sunday-school teacher, in telling about Daniel in the lions' den, would hope ultimately to impress upon her pupils the general truth that God protects those who trust in Him; but the object of the recitation which she would give to the class might well be "to find out how it happened that Daniel was thrown into a den of lions, and what came of it." This is a concrete statement and would naturally arouse the interest of children. Instead of saying that "we will find out to-day what per cent one number is of another," we could better give this problem, "A camel lives forty years and an elephant one hundred and ten years; the age of the former is what per cent of that of the latter?" Also, instead of the question, "What are pronouns?" which is abstract, aiming at a definition, it would be better to set up the following object, "Let us see what words are used to take the place of *Columbus* in the composition you have written about him." In place of the question, "How do cities obtain their water?" it would be better to ask (if one lived in Chicago), "Where does Chicago get its water, and how is it brought to the city?" In teaching the fable about the Lion and the Mouse, the teacher may properly aim to show to her pupils that little things may be of much help; but her concrete statement might be, "Let us hear a story about how a mouse once saved the life of a lion." Thus the first requirement of a good aim is fulfilled by making it concrete.

The *second* important requirement is that the aim be *definite*. Little is accomplished by announcing "a continuation of the same subject." And a teacher fixes a very imperfect purpose before her class when she states they will study "About Bunker Hill," or "About leaves," or "About Spain," or "About the union of our states." The following aims are much more desirable: "How the Americans outwitted the British and drove them out of Boston," "Where leaves grow; why they are so thin; why they fall," etc., "Why nearly all the large cities in Spain are on the coast," "What prevented the union of our colonies from breaking to pieces at the close of the Revolutionary War." The advantages of the latter consist in the fact that they are definite enough to concentrate attention upon a particular point.

As far as possible one should state an object which can be accomplished within one recitation period, and consequently some of the aims just stated might need to be divided somewhat. For example, the one in regard to Bunker Hill might be stated thus: first, "Let us study the plan that the Americans adopted to outwit the British and drive them out of Boston"; second, "Let us see how this plan was executed." In each case the class would be expected to review the situation in which each army was placed, etc., before the advance instruction begins: this would constitute the preparatory step.

The *third* requirement is that the aim be *short*, *simple, and attractive.* Strange words would not be acceptable. Hence, with children, it would be better to ask, "How do leaves help the tree?" than "What is the function of leaves?" Also, "What changes does the caterpillar pass through?" rather than "What are the metamorphoses of the caterpillar?" Of course the simpler the statement, the more easily it is understood; and the shorter it is, the more easily it is reproduced. It is usually desirable that the children reproduce it at least once at the beginning of the recitation in order to make sure that it is understood. The attractiveness of the aims stated will depend upon the happy combination of what is familiar and what is new to the child. Here is a great opportunity for skill on the part of the teacher. The wording should be such that the class will feel at least partially acquainted with the topic and still strangers to such an extent that they will be desirous of learning more in regard to it. That aim is weak which does not awaken a feeling of need in the child for more knowledge.

The several requirements of the aim, therefore, are as follows: it should be concrete, definite, simple, short, and attractive. The fact may be well emphasized once more, that these are the requirements of the aim which is to be given to the children at the beginning of the recitation.—Such a statement does not mean the giving of the rule first; the rule is abstract, while the aim recommended is concrete. The teacher keeps the rule in mind, since the instruction should finally arrive at this result; but it would be unpedagogical for her to say anything about it beforehand to the children. — The *form of the statement* may vary, being either a declaration or a question or a problem. But whatever form it assumes, it should not reveal new facts in such a way as to deprive advance instruction of its interest. One can easily tell too much. For instance, in regard to the water supply of Chicago, he might declare it to be his aim, "to see how a tunnel brings water to the city and an engine pumps it into the tower;" or, the object might be, "to see how unproductive the interior of Spain is because most of the rain falls on the edge of the great plateau," or, "how we add fractions by making them alike." These statements contain facts that should be revealed in the later instruction; if stated at the beginning, they weaken the instruction which is to follow, just as the inadvertent telling of the point of a joke weakens the narration of the joke itself. The advantages of an aim that fulfils these conditions are manifest. It renders a recitation easy to conduct, because it furnishes a strong motive for work upon a particular subject. Children become eager to collect and present their related ideas.

Why a properly worded pupil's aim is difficult.

But there is scarcely a more difficult task in all teaching than the preparation of an aim that fulfils the few requirements named.

1. The teacher must comprehend clearly the study that she is teaching; also, in planning each lesson, she must distinguish the essential facts from those that are comparatively trivial. The aim that is stated should direct attention to the central idea in a concrete way; such an aim cannot be conceived until the relative value of thoughts is determined and the real gist of the lesson perceived.

2. The teacher must know the contents of her pupils' minds, their emotions, and so forth, before she can frame a statement that will appear to them definite, short, simple, and attractive.

Advantages of a good aim.

A good aim becomes a *standard* both to the children and to the teacher for judging the worth of contributions by the former. Since this first step is necessarily conversational, there is always danger that the discussion will degenerate into a conversation that aims at nothing and accomplishes nothing. But when all are conscious of a fixed aim, reference to it by the teacher or pupils will determine whether or not a certain thought is worth their attention. For example, if the class sets out to show how water reaches houses from the lake (in Chicago), the child who is eager to tell about the bursting of the water pipes in his home on a certain cold night may be immediately ruled out. This measuring of the relevancy of thoughts is an exceedingly valuable exercise for children; it calls judgment into play.

Also, the *development of will* is intimately involved in the fixing and attainment of an aim in each recitation. "Without aim, no will," is an important dictum of the Germans. That is, when one fails to see clearly what is at issue, he feels little incentive to exert himself. This thought was in mind in the assertion that a definite aim furnishes a *motive* for effort. But, further than that, if one daily sets up objects to be accomplished and is successful in reaching them, he falls into the habit of succeeding. The energy and perseverance that we show in overcoming new obstacles are greatly conditioned by such a habit. If, as we look backward in time, we recall the fact that it has usually been our lot to fail, courage evaporates. But if we see our past efforts crowned with success, self-confidence is great and energy is increased. Thus the past influences the anticipations and the results of the future. That instructor who daily leads her pupils to attain certain ends agreed upon, is accustoming them to success; she is developing in them a belief in themselves which will cause their will action to be energetic and persistent.

We see the special importance, therefore, of repeating the aim until it is clearly fixed as a purpose in the pupils' minds; and at the close of the recitation it is important to compare the work accomplished with that aim.

Omitting further discussion of the aim in particular, one merit of this preparatory step deserves

Relation of preparatory step to reviews.

still to be noted; namely, it affords *opportunity for frequent reviews* of the best possible kind. It is all important that children recall frequently any knowledge already acquired; otherwise it is likely to escape them. For this purpose reviews are often held at the end of a term, occupying one, two, or three weeks; or, if not then, they come during the term whenever any subject is completed. But in such reviews progress is so rapid that the work is less thorough than when the topics were studied the first time; their avowed object is not greater thoroughness of knowledge, but merely the refreshing of the memory in regard to it. Such work is an injury. Any review that takes place merely for the sake of review, and that does not require new thought, tends to check mental life: mere repetition for repetition's sake has a deadening effect. But how can this evil be remedied, since reviews are essential? This step of preparation is a partial remedy, for it furnishes abundant opportunity for *incidental reviews*. In approaching any new subject, as England, or the union of our country, or changes in insect life, or the battle of Bunker Hill, those familiar facts are recalled that bear upon it. They are not reviewed merely for the sake of review, *i.e.* without a motive on the part of the pupil, but because they are a valuable preparation for what is to come. Such work is full of interest. Children feel their strength when recalling an abundance of experiences preparatory to later instruction; their minds are on the alert. Any ideas that are closely akin to the subject are at a premium, whether they come from the study immediately under consideration, or from other branches in school, or from home experiences, from reading, from travel, etc. This careful scrutiny of one's stock of ideas with the purpose of selecting only a certain relevant kind means a review of the old from a new standpoint, with a new element in it that arouses interest; this is the only kind of review that should be tolerated; as it is the kind that this preparatory step is continually bringing about, the latter should, for this particular reason, be highly valued.

Since there is only one way to acquire knowledge, *i.e.* since all new facts can be interpreted solely by those already in our possession, it is evident that, in insisting upon this preparatory step, we are only demanding that a universal law of learning be applied. If it is ignored, children will encounter much friction and hence will learn slowly and with little effect; if it is carefully applied, many of the artificial barriers to their progress are removed, so that they advance thoroughly and rapidly.

Time required for preparatory step.

The *amount of time* that this step requires depends upon circumstances. In beginning the study of Spain it might not take more than five minutes to recall the facts that Columbus sailed from Palos, Malaga grapes come from southern Spain, bullfighting is the national sport, we were recently at war with Spain, etc. The time taken is dependent upon the number of things the pupils know. The introduction into England might easily occupy thirty minutes. Sometimes it will take even more time than that to collect what the class knows and to mark the limits distinctly between what they are certain of and what they are doubtful about. As a rule, the aim for any single recitation will cover both review and advance work, and the latter will begin as soon as the former is finished — as in the preceding examples. If a class were to set out to learn the products of Ireland, it might require fifteen minutes to collect the few familiar facts, *i.e.* that this is called the Emerald Isle, that Irish linens are famous, etc.; then a fuller investigation of the reasons why this is so green an island, or why so much linen is manufactured here, would begin immediately and constitute the advance work.

Now and then, as in literature, history, and, in fact, in most studies, the desired related experiences of the past come so easily and quickly into the consciousness of the children that the advance lesson may begin immediately. But when we recollect that they must pass very frequently from one study to another, and that, in so doing, they are required to direct their attention suddenly to a different subject, we can appreciate the difficulty they find in collecting the desired facts and in entering into the spirit of the lesson at once. On the whole, it is very unsafe to take for granted that the necessary ideas are present; it is ever wiser to take at least a glance at the foundation, and in most cases to examine it closely, before proceeding to build upon it.

Method conversational.

The method here is entirely conversational; it could not be otherwise, since each child is merely offering whatever he can bring to bear. It is well to arrange the thoughts given under headings, and frequently at the close of the step to recapitulate, in order that the exact amount accomplished may stand out and the pupils may thus keep their bearings.

This is often called the step of *analysis* as well as the *first* or the *preparatory* step. It is plain that this other name is in place, since in it the children are required to analyze the contents of their minds, or to separate a certain few ideas that bear on a special point from the many others which are in their possession.

CHAPTER VII

HOW INDIVIDUAL NOTIONS SHOULD BE PRESENTED

THE first step prepares the foundation; this second adds a portion of the superstructure. In the first, those thoughts that bear on a certain topic are separated from the other contents of the mind, hence that is called the step of analysis: in this second the new thoughts are united with the old, hence it is called the step of *synthesis*. . If the former has been successful, the latter will show the effects speedily.

How preparatory step saves time here.

Judged by common practice in teaching, the first step involves great loss of time, for instruction usually commences with the second. But as soon as one begins presenting the new concrete facts, the effect of a good preparatory step shows itself by allowing much more rapid progress than is otherwise possible. The children, being able to comprehend the topic in hand, and being also interested in it, are much more on the alert than otherwise, and can digest more rapidly whatever is offered. Also it is unnecessary to interrupt the instruction by long explanations, and by detours to hunt up related experiences; consequently the time is occupied more completely by the advance instruction.

The same reasons hold for the *statement of an aim* in this step as in the step of preparation. That is, an aim will concentrate attention and furnish a motive for active thinking. The fact that it makes the child conscious of the course he is pursuing, and thus prevents unexpected discoveries, is greatly in its favor. While it is an excellent thing to make discoveries, it is much better that they be dimly anticipated than that they be entire surprises. Students of all ages should realize which way they are bound, and if they comprehend the situation so well that they foresee what is likely to come, it is a very encouraging sign. In fixing the aim the same precautions should be observed as have been discussed.

Necessity of an aim.

The form of presentation, that is, the way of getting at the facts, may vary greatly. The children may hear a story and discuss it; they may read a selection, study a map, or a geography lesson, in the book; they may examine and sketch a flower; they may interpret and work out a set of problems in arithmetic, or perform a suggested experiment, or study the conjugation of a verb, or examine and discuss the objects of a science lesson freely with the teacher. So long, however, as the class is engaged in acquiring new and concrete subject-matter, it is always the second step of instruction.

Form of presentation.

But while there is so much variety in the form of recitation, it is due rather to variety in the subject-matter taught than to difference in the methods employed. In the main, most subjects are treated according to one of *three methods;* namely, according to the lecture, the text-book, or the developing method.

1. The *lecture method* is followed extensively in college and university work, and to some extent in high schools. According to that plan, the teacher imparts knowledge directly, or tells the facts which the students are expected to learn. When it is remembered that lecturing is synonymous with telling, it is evident that the method is not wholly unknown even to teachers of small children. They very often spend five, ten, fifteen, or twenty minutes telling thoughts from a Sunday-school lesson, or facts in geography, history, etc.

2. *Text-books* have long been in vogue and are probably as popular to-day as ever. Recent years, however, have brought very great improvement in their use. There was a time when it was customary for children to learn verbatim the text in grammar and geography. It is needless to say that that work was destructive of the best qualities of mind. Subject-matter was often committed to memory that failed entirely to be understood, although a pretence to the contrary was made. In the main, it was the memory that was appealed to, rather than the ability to understand and appreciate.

In more recent years a better class of teachers has required pupils to memorize only the substance of the thought, neglecting the form of expression in the book. They have often even discouraged similarity between the language of the child and that of the book, hoping thus to throw the chief emphasis upon the thought itself.

A third class of teachers also require only the gist of the lesson, but instead of employing the recitation period for a mere reproduction of the thought, they occupy a good part of that time with discussion, so that the ideas presented in the book may be comprehended and appreciated; for example, after an outline of facts in connection with the battle of Bunker Hill has been committed to memory, the events are discussed in detail in class until an accurate and vivid picture of the whole is constructed. Likewise, after the definition of the subject of the sentence, as presented in the grammar, has been carefully studied, numerous sentences are offered by the children and discussed until a fair understanding of the matter is reached.

It is evident that this way of using text-books is much better than either of the other two mentioned; by it a greater interest is awakened, misconceptions are corrected, and more effective knowledge is acquired.

3. The *developing plan of teaching* is one radically different from the lecture and the text-book methods. The teacher who employs it lectures but little to her class, although it is important to remember that she does tell some things outright; neither does she

allow the facts that are to be learned to be first presented through a text-book; she prefers to develop facts and conclusions by conversation with the pupils. The nature of this method and its difference from the text-book plan were suggested in Chapter II on illustrative lessons; other examples will reveal its characteristics more clearly still. Frye's "Primary Geography," page 108, states the following facts in regard to the British Isles: —

"In the British Isles there are vast beds of coal and iron. Near these many great workshops have been built. People of the British Isles weave into cloth fully one-third of the raw cotton and wool raised in the world. They also produce one-third of the iron and steel. Their ships carry on one-third of the commerce. To the British Isles the United States sends cotton, grain, meat, tobacco, copper, and many other products. Which of these are needed for the workshops? Which are used for food? The British Isles send to the United States iron and steel goods, cotton, wool, and cloth, silk, and many other articles from the workshop. London, on the Thames River, is the chief seaport and railroad centre of the British Isles. It is the largest city in the world. The greater part of the trade of the United States is by way of Liverpool, a city near the west coast. Scotland is noted for its iron and steel ships. They are built on the Clyde River near Glasgow."

The text-book method allows these statements to be studied before the recitation period begins, and then to be talked over in class until they are sufficiently well understood and impressed upon the mind. In the developing plan the book would not be used at first; the following might be the nature of the conversation that takes place in the class, the teacher beginning thus:—

Many years ago it was discovered that there was an abundance of iron ore in England (showing where). Also a great quantity of coal was found in certain places (use map). So much being true, what might follow? When people have plenty of iron ore and coal, they can make pig-iron and all sorts of things from which iron is made; for instance, nails, screws, hatchets, axes, ploughs, rails, locomotives, all sorts of machinery, cutlery, iron ships, etc. What effect would that have upon the number of people to be found in the region where these manufactories exist? Large cities would spring up. Thus Manchester, Leeds, Sheffield, Birmingham, Nottingham, and Glasgow, which you will find on the map.

Since so many people are engaged in manufacturing, what would be done with the articles that they make? They cannot use them all at home. Then what will be done with them? Some of them must be sent away to other countries. What, then, will be some of the exports of England? Rails, engines, etc. Through what ports would they be likely to leave England? (Examine map frequently.) It would depend upon the direction in which they were to be sent. If to Europe, they would go by way of Hull or London; if to America, by way of Liverpool, or possibly Bristol. What effect would this commerce have upon the size of these ports?

If so many of the English people are engaged in manufacturing, and they send so many things abroad to America, for instance, what are some of the things that they are likely to need from us? Food. What, therefore, would be some of their imports? Grain, meat, tobacco, etc.

But England is an excellent country for grass. Can you tell why? Because of the moist atmosphere and frequent rains. A considerable part of the country, too, cannot well be cultivated; can you tell why, from the map? It is too hilly and rough in the west. Yes, also in places it is too swampy. In many of these regions sheep are raised. What is likely to follow from that fact? Much wool, much manufacture of clothing, since coal is abundant. Hence, increase in size of cities, in importance of ports, etc.; clothing is one of the exports, etc.

All of this conversation could best take place before the paragraph in the book is assigned as a lesson.

Take an example from literature; namely, from the story of Robinson Crusoe. Suppose that a point in the story has been reached where Robinson has been shipwrecked and is lying senseless upon the island near the water's edge. If the recitation begins at that point, it might proceed as follows: —

When Robinson came to his senses, he stood up and looked about. What do you suppose he said to himself? "Where am I?" What would he do then? Recall what had happened. And further? Hunt for his companions. How would he hunt for them? Look for them. And? Walk up and down the shore. More than that? Shout for them. Yes, but he did not find them. What conclusion would he reach? That they were all drowned. How do you suppose he felt? Very sad. Had he any reason for feeling glad? Yes. What? His life had been saved. How might he show that he was glad? By kneeling down and offering a prayer of thanksgiving. And that is what he did. Then what would he do? He would hunt for other people, houses, etc. He did so, but he found none. As time passed, what else would he begin to think about? Something to eat and drink. What could he hope for if there were no people? Some wild berries, apples, etc. Where would he find them? Growing in the woods, etc. But he found nothing. Finally, as night was coming on, what would he begin to think about? Where he might stay during the night. And where could it be? He might sleep on the ground. But there was some objection to that. What? He was afraid some wild animals might find him. What else could he do? Build a hut; go into a cave; sleep in a tree, etc. Yes, the last is what he did. What kind of a tree would he search for, etc.?

Thus the story may be taught from day to day, the children telling what might reasonably follow from a given situation. In this case the teacher needs to do very little except to put skilful questions based upon a few given facts.

Let another example be taken from history; namely, the battle of Bunker Hill. Suppose that the class understands that the British are shut up within the city of Boston. The aim might be to see how the Americans outwitted the British and nearly succeeded in driving them out of the city. We recall the situation of Boston harbor, the Boston and the Charlestown peninsulas, etc. The teacher then tells the class that there was a hill over on Charlestown peninsula which overlooked the city. The conversation might continue as follows: a brilliant thought occurred to the Americans in connection with this hill; what could it be? That they would seize it. Why? Because if they had possession of it, they could drive out the British. How? They could fire down onto Boston. But would they destroy their own houses?—remember they built Boston. Yes, they would, if it were necessary in order to drive out the British. How would they go to work to carry out their idea? They would take possession of the hill quietly. When? By night. Describe how. What would they do after reaching the hill? They would throw up earthworks. Describe the earthworks. What question have you to put in regard to the British when it came morning? "How would the British feel when they looked up and saw the fortification there?" They would be greatly surprised and excited. What could they do? One of two things: abandon Boston, or capture the fortification. They decided to do the latter: how would they do it? Send a body of soldiers over to march up against the fortification. This was done. As the British marched up the hill, would they go slowly or rapidly, and why? What do you suppose the people over in Boston were doing? Probably as many as possible were up on the tops of the houses to see what was going on. The British stormed the fortification, but were repulsed. How do you suppose the people in Boston acted when they saw that? A second repulse followed. But on the third charge the Americans' powder gave out. What would follow? Who had won a victory? Why?

This latter method is often employed in such a subject as *language work*. For instance, the children desire to write a composition, and some of them are inclined to omit the title or put it in the wrong place, etc. When this is the case, the following conversation might take place: —

Ought you to write any title for your composition, or not? Yes. Why? Because we want any one who reads the composition to know what it is written about. Where would you put the title? At the beginning. Good; just where would you place it? Place it out by itself. Why? So that it can easily be seen. Good; what kind of letters would you use in writing it? Large letters. Why? Because they are plainer and can be more easily read, and so on. Good.

Facts in regard to paragraphing and use of capitals, periods, margins, etc., can be easily developed in the same way.

How measure the relative worth of these methods.

The developing plan has now been illustrated by examples from geography, literature, history, and language work. Several other examples are suggested later in Chapter XI. Before judging the relative merits of these three methods of teaching; namely, the lecture, the text-book, and the developing methods, it is necessary to determine a *standard* according to which the worth of each may be measured. Happily this standard is easily obtained from suggestions in the preceding pages. Since teaching consists in fitting new ideas, feelings, etc., to those that are already at hand, or since it consists in dovetailing the new with the old, or adjusting what the teacher has to give to what is already in the child's mind, that method will prove the most worthy which secures this desired adjustment in the highest degree.

It should be remembered that, if the adjustment has taken place in the proper manner, the good effects must show themselves, *i.e. interest* is aroused, the minds of the pupils are *active* in producing thought, they themselves even have questions to ask in class, and in expressing thought they use their own words rather than those of the teacher or of the text-book.

This standard applied to the first two methods.

Having now this standard of values, let us turn to the three methods presented. Lecturing ordinarily consists simply in offering or telling. The instructor regards the mind as a granary or storehouse, and pours into it the desired knowledge. The learner is not the central thought of the teacher, but the latter directs his attention primarily to the knowledge that he is imparting. Consequently there is little tendency to adjust the new knowledge to what is already present in the pupils' minds. Past experiences count for little. Hence this method does not arouse a high degree of interest nor lead to mental life. Teachers who adopt it and fall into the habit of "telling" most of the facts that they desire to be learned, are a source of little inspiration. It is being abandoned to some extent even in our colleges.

The text-book plan is essentially like the preceding. The difference lies in the fact that books appeal to the eye by the printed page, while the lecturer, or the one who tells, appeals to the ear. So far as the adjustment of the new to the old is concerned, there is less of it in the text-book than in the lecture. The lecturer, as he stands before his class, necessarily adapts his thoughts somewhat to his individual audience. But the text-book is intended for no individual audience. Any author of a common school geography writes for the average child in the United States. He is as far from preparing the text for a certain child, or for the children in a certain community, as he can possibly be.

Nevertheless, the third method of using the book, according to which the substance of the text is studied, and then carefully discussed in class, greatly remedies this defect; conversation affords opportunity for calling up related past experiences, correcting misconceptions, etc., and thus the new becomes adjusted to the old. For instance, pupils studying Barnes's description of the battle of Bunker Hill, can discuss it in class until they see a vivid picture, or they can enlarge upon his brief statement of the causes of the permanent union of our states until they have really entered into the spirit of the situation.

Hence, this method can excite interest and mental life, leading to much freedom on the part of the children or students in conceiving questions, and in using their own language in the expression of thought.

Fuller meaning of the standard as suggested by arithmetic.

But the real question under consideration is, What is the *best* method of instruction? While this use of the text-book accomplishes much good, it may not be the best method there is. Indeed, that it is not ideal, is apparent when viewed in the light of facts that are generally accepted in the teaching of mathematics. In arithmetic, for example, there are two parts to each problem, *i.e.* the answer, and the process by which the answer is reached. Answers in themselves — it is claimed — have little value; the worth of the study lies, first of all, in the process by which they are obtained. Further than that, the thinking necessary for the discovery of the right process, must be done, as far as possible, by the pupil. It is a serious violation of the law of self-activity to tell a child how to solve a problem; he must solve it himself if he is to be much benefited.

Is the case different when we come to geography, literature, history, etc.? That these branches of knowledge likewise consist of problems and their answers, cannot be doubted. For instance, the paragraph on the British Isles, quoted above, suggests several important ones, such as the following: —

How would the presence of an abundance of iron ore and coal be likely to affect the occupation of the English people, and also the population of England? What are some of the exports likely to be in consequence? What the imports? Why should England be a wool-producing country?

In the part of the story of Robinson Crusoe that has been presented, the text offers the answers to the several questions: —

What would Robinson first say to himself when he came to his senses? What would he then do? What conclusion would he reach in regard to his friends? How would he feel? Where would he hunt for food? How would he spend the night? etc.

The text in the history discribing the battle of Bunker Hill likewise answers a series of definite questions: —

What plan to outwit the British might well come into the minds of the Americans when they began to reflect about Bunker Hill? How would they execute that plan? etc.

Much of the text in ordinary school books presents answers to questions, just as the key to an arithmetic presents the answers to problems. Further than that, the answers to such questions are as easy of solution on the part of children as ordinary examples in arithmetic. Why, then, should the value of arithmetic be found in the *solution* of problems, while that of these studies is confined to *learning* the *answers to problems?*

Weakness of text-book method revealed by this standard.

But the ordinary text-book method, even where thorough discussion is permitted, does not allow such liberty to the pupil. Instead of permitting him to weigh problems and suggest reasonable solutions for them, it offers the latter to him outright with the expectation that they be comprehended and learned.

One result of this defect is that the knowledge lacks thoroughness because the *problems themselves are largely omitted from thought.* It is a very easy matter to overlook the chief questions involved in a given text. For instance, the author recently conducted a class through Herbert Spencer's "Education." When the first chapter discussing "What knowledge is of most worth" was finished, the students were asked to state the important questions answered. One of the most prominent thoughts in the text is that, since science is the most useful kind of knowledge, it should constitute the curriculum. This seems at first sight a strange and narrow conception on the part of Spencer, and has aroused much opposition. But when we understand that he includes very nearly all the school studies under the term *science*, the situation is not so bad. Undoubtedly one of the first questions to ask in this case is, What does Spencer mean by science? Without conceiving this question clearly, one can scarcely realize that he has received its answer, *i.e.* he does not comprehend what is said. Yet in a class of eight persons who average ten years of experience in teaching, only one seemed to have grasped it.

Result of this weakness.

Children and adults are alike in this matter; they both easily omit from thought the questions whose answers they are supposed to be receiving. But they should see each problem, and they should even ponder its solution for a while without aid, in order the more fully to realize what the question is, as well as their own weakness or need in disposing of it. Then they are ready for real appreciation of the answer. For example, in addition of fractions, children should for some time face the questions, Why make the fractions alike? and How do it? before answers are decided upon; otherwise they are too likely to learn the steps involved in the method without being much impressed with the essential thought at issue. So, after learning that England produces a great quantity of iron ore, it is well to allow the class a certain time to consider what should accompany this ore, *i.e.* coal, in order that it may be utilized; likewise they should be given time to reflect upon the products following from iron and coal. If, before they have had time to think, they are *told* that iron ore cannot be worked without coal, and that the two used together can produce steel, hatchets, engines, etc., they are in danger of accepting the facts without realizing the vital relationship between them; in that case they *omit the best part of the thought.* In brief, *if we want to make sure of real appreciation of knowledge, the facts offered must come as answers to questions that have been consciously felt;* only in this way can a close adjustment of the new to the old be assured.

This weakness due to a false conception of child nature.

But there is a more fundamental fault still in the ordinary use of texts. When a lesson is assigned in a book and then carefully discussed in class, the tacit assumption is that the work of the pupil is to receive. He gets what he can by his own study of the text, then the instructor quizzes him in regard to it to make sure that he receives it correctly and that he receives all of it. Now, is it true that the one who is being educated is chiefly a receiver? Is that a high conception of education? Is not the child normally also a discoverer, a producer? And should not the *best method* make abundant provision for self-expression, for outgoing, originating activity, as well as for passive impression?

Certainly before he enters school the child is exceedingly active as a thinker; he conceives an abundance of questions and as many answers; it often seems, at least, that he divides his time about equally between questions and answers. To be sure, he receives suggestions of all sorts from persons about him, but this help is a minor factor in his mental life; he is primarily a producer of thought. The kindergarten is based upon this truth, and the mission of the instructor there is not to tell the child facts, so much as to prompt him to produce thoughts that are facts. Thus we see one's employment before he enters school proper.

After one leaves school and enters upon adult life, the situation is not changed. No matter what the position may be that he takes, he is still not mainly a receiver. Whether he becomes a teacher or a manufacturer or something else, his first duty is to conceive clearly what the problems are that confront him. Much of the time must still be occupied in thinking questions. The teacher must ask himself what his duties are toward the parents of his children, toward the children themselves outside of school, toward religious work in his community. He must ask himself if he intends to be a real student, and, if so, how he can best arrange to carry on study, etc. The manufacturer must go over his field in the same way, mapping out the problems. No one is on hand to tell either of them just what questions are involved in his peculiar situation. He may receive help on particular points from various quarters. Now and then an angry parent brings unexpected light as to a teacher's duty in a certain direction. But, in the main, each individual must depend upon himself to know when he has covered the field and has seen all of the important problems involved in his work. If some of them are omitted, he must suffer in consequence. Many a business man discovers too late that he did not ask himself questions enough in regard to a proposed project; he did not see all sides of it.

After the problems have thus been marked out in thought, the solution of the same must be reached. Again, each one must depend upon himself; he may receive help and advice, but he himself must decide whether the advice is good or not; he must do his own thinking all the time, and his success is dependent upon the care and completeness with which it is done.

So far, then, as the thought side of adult life is concerned, it is not essentially different from that of the child: each spends his time upon problems and their answers; each, though he receives valuable facts from many sources, must conceive his own problems and his own answers. We find, then, that originality is natural to childhood and a necessity in adult life; each human being is by nature, and also *must* be, a discoverer, a producer of thought.

Now, proper preparation for life requires that those good qualities, that are natural and necessary, be encouraged by training. Does the school now lead children to conceive questions and answers abundantly? And, if not, how should it improve its methods?

Suppose that a boy has passed through many textbooks in the grades, the high school, and college. Suppose, even, that thorough discussion followed the study of the texts. Has he received abundant practice in mapping out the chief problems necessary to a certain topic? Has he had the same practice in reaching their solutions? And is he, in consequence, an independent thinker? Ordinarily the answer must be, *No!* Books are not planned with reference to this thought. The ordinary conception is that if one knows plenty of facts, he will naturally do the thinking necessary to their proper use; hence, the books offer these facts. But the result is that the learner occupies his time in accepting ideas of other people rather than in giving forth ideas that have originated with himself. In that way education, viewed from the teacher's side, comes to mean putting in, pouring in, while the derivation of the word, *e* and *ducere*, means to draw forth, draw out. The learner, then, becoming a receiver, is made relatively passive, while his nature and the needs of life require that he be intensely active.

A hint as to a better method is given by the children themselves. When they are taken to a museum to see Indian relics, or when they are allowed to witness simple experiments in physics, they dislike having to stand back and merely look on; they have an insatiable desire to touch and handle the relics, to help arrange the apparatus. They are so constituted that they can learn better if they are allowed this activity. — They show the same attitude toward thought materials. That is, when there are no relics or apparatus present, and when they are dealing only with thoughts in the presence of their teacher, it is still unnatural for them to stand back and merely behold the thoughts that she or the book presents; they want to join in and help in the production of thought, and if this liberty is denied them, while they may learn a great deal, the amount is not what it might be, and is not welded to their personalities as it should be.

Hence the conclusion is reached that even the text-book method that provides for much discussion is seriously at fault; it contains mainly answers, thereby largely omitting questions. And these answers, many of which the child could discover for himself, are furnished to him before he has been allowed time to think them out himself; it is, therefore, a systematic violation of the *law of self-activity*. But in order to comprehend thoughts, or to adjust the new to the old properly, one must conceive clearly the problems involved, and must reach these problems and their answers largely through his own effort, *i.e.* through his own self-activity. Inasmuch as the text-book method does not fulfil these requirements, it does not secure a high degree of adjustment of the new to the old.

The standard applied to the development method.

The third method under discussion, that of development, avoids these errors. It makes both problems and answers prominent, and it puts the questions to the child before their answers have been presented. More than that, the child is expected to *conceive these answers himself;* he is systematically required to make discoveries, to judge what might reasonably follow from a given situation, to put two and two together and declare the result. Often, too, he finds it possible to *discover the leading questions* involved, as well as their answers; he must often state what should be the next question to be considered, and by practice in such thinking he becomes skilled in *conceiving both problems and their solutions.* Thus provision is made for adjustment of the new to the old by the large amount of self-activity allowed.

Another valuable feature of the developing method is the fact that it provides for a *close sequence of thought.* Text-books ordinarily omit many of the necessary connecting links of thought. For instance, most text-books in United States history do not state clearly why the Americans wanted possession of

Bunker Hill. In the latter part of the Revolutionary War the fighting was removed to the South, but books often state the fact of removal without going into details and reasons. So it is usually: the text contains an outline of events or leading thoughts; it is merely a text, *i.e.* it presents the chief topics without building the connections between them. It lacks space to do otherwise. The developing plan, however, provides for short, connected steps in thought; the children themselves are expected to take the steps, and hence there cannot be broad chasms between them. The result is that *close series or chains of thought* are established, and because they are thus so closely connected they are brought into intimate relation with the child's way of thinking, *i.e.* the new is closely adjusted to the old.

It should be remembered that the basis for the many judgments passed by pupils is their past experience. Past knowledge furnishes the premises from which new conclusions are drawn, hence the *relation of the new to the old is close indeed.* We see really the spirit of the first or preparatory step carried into the second; the developing or conversational method reveals the learner's *doubts* and thus makes constant provision for adjusting the new to what is already present. Of course, it is often difficult for pupils to enter into the spirit of a situation, and then they make ridiculous blunders. One little girl, when asked how Robinson Crusoe might secure more clothing, suggested that he would telegraph home. But the fact that the other children laughed, threw the desired emphasis upon the constant exercise of good judgment or good sense. But when pupils do enter into the situation, they not only conceive reasonable answers to questions, but, as said above, they anticipate the questions themselves. For instance, in the story of Crusoe, thoughtful pupils will name many of the chief topics that must be considered long before they are reached in the actual instruction. They must have entered into the spirit of the story to do this, and to be in the spirit of any subject means real apperception.

Experience shows that the developing method can excite much interest and thoughtfulness, and secure from the pupil a frank expression of his opinions and doubts. Indeed, his teachableness, or desire to reach the truth without thought of self-exposure and artificial rewards, is admirable.

The best of the three methods.

Of the three methods of teaching under discussion, this last is undoubtedly the one by which the closest adjustment of the new to the old with the accompanying benefits is secured; it is consequently the best. This is the method that was employed by Socrates. He was convinced that the human mind could discover much truth through its own energies, provided the instructor knew how to guide it properly; accordingly, teaching meant to him not the telling of what the instructor knows, but rather the asking of such questions as will call up previous experience, guide the thought of the student, and draw him out (educate) to a free expression of his own ideas. The new conclusions reached in the course of the conversation constituted the knowledge acquired.

Notwithstanding the superiority of the developing method, some facts advise strongly against any attempt to make exclusive use of it.

Limitations of its use.

In the *first place*, *not everything can be developed*. Beyond doubt there are many facts in every study that should be reached through discussion rather than told outright. But there are also many in some studies that could not possibly be so reached; and there are others that, although they could be developed by considerable ingenuity, are better told outright. Hence, any one who makes exclusive use of this method has become an extremist.

In the *second place*, this is an *extremely difficult method to follow*. Just as the sharpest tools must be handled with the greatest care, so this plan of teaching must be skilfully applied, otherwise astonishingly meagre results or even serious injury may follow. On that account inexperienced teachers should not attempt to make use of it exclusively, or even mainly; they should accustom themselves to it slowly, making trial of their strength here and there as opportunity offers.

Thirdly, the *intellectual treasures of the past lie locked up in books*. Proper school training unlocks this storehouse by accustoming one to their intelligent use. Hence, books must be in constant use in the schoolroom, and even text-books must occupy a prominent place there. It follows from these facts that neither the text-book nor the developing plan is worthy of exclusive adoption, but that each should be accepted to some extent. The former is especially necessary to primary and intermediate grades. For, if children in these early years learn how to think through oral instruction, they can carry this thinking power over into books. But the method of discussion is also greatly needed in grammar grades, and, in fact, throughout later education.

How the text book and development methods may be combined.

A careful examination of the developing method convinces us that the right kind of conversation is the best means of thoroughly welding new thoughts and feelings to those already in the child's possession, and an examination of text-books shows that they tell many things that could far better be discovered by the children without the aid of any book. Hence, conversation for the sake of developing facts should be prominent in all school instruction; and since text-books, if used to introduce the topics, would often deprive this conversation of its point, their perusal should in such cases *follow* rather than *precede* the discussion itself. The last statement is a very important one indeed. It is a mistake for a history text to introduce a class to the French and Indian War by naming the "five objective points," when the class itself, by taking thought, could locate approximately the chief points where fighting would take place. Further, if children are prepared for their work, they know that fractions must be alike before they can be added; they can anticipate some of the dangers accompanying Midas's golden touch; they can state many of the evil consequences of our lack of a national coinage system. In such cases it is well to pause in the use of the book in order to give them time to conceive their own thoughts first, and thus do original thinking. In some studies recitation after recitation can well employ only the developing method; this is notably the case with Crusoe in the second or third grade, with much of the nature study throughout the grades, with pedagogy in the university, etc. In other subjects, as in history, geography, arithmetic, etc., where text-books are necessary, discussion can both precede and follow the study of the text on a given point; in either case it might occupy only a few minutes, or a whole recitation period, or even more, according to the nature of the subject-matter and the ability of the children and of the teacher. When a whole chapter has been practically developed in class, it is still well to turn to the book in order to review and summarize what has been accomplished; hence the book is of great value even where most of the time is given to development.

From these remarks it is clear that we do not advocate using the book entirely or giving it up entirely; on the contrary, the text-book and the developing method can be employed together and alternate with each other as occasion demands. School instruction should certainly culminate in the ability to use books properly, but that does not necessitate abundant use of text-books, especially early in school life, or even exclusively at any time.

How the use of books may prove injurious.

One defect with many people is due to the fact that they began text-books so early in school and followed them so closely that they never learned to distinguish their own thoughts and opinions from those of books; in fact, they are scarcely aware that they have opinions of their own. Yet one of the prime requisites in judging the worth of books is a consciousness of, and belief in, one's own opinions. Even a child must possess the intellectual self-confidence of a critic in order to comprehend and weigh a text, and this requires an extensive development of the self. Nothing is more striking in the young child than this native self-respect. He rejects whatever fails to appeal to his own good sense, though he readily submits to all legitimate authority. Instead of encouraging this natural robustness, which is later essential to true scholarship, the school often almost extinguishes it by the weight of imposed information through books. Many persons would be much stronger if they had been often entirely freed from books and had had much daily exercise in expressing their own thought entirely untrammelled by remembrance of any text. With children especially there is always the danger that an extensive use of text-books in school may result in slavery to books or loss of independence in thought, rather than in a mastery of books and ability to use them properly.

The above considerations are particularly important here because they affect one's attitude toward discussion as a means of teaching. Books must be provided for; they may be used to review ground covered in conversation, to continue investigation of topics that have been already introduced and partially treated, or finally, among older pupils, to further information and increase culture generally. But from what has been said, discussion should be prominent in all good teaching, from the kindergarten through the university, for it is essential to the preservation of independence and originality. With the understanding, then, that the developing and the text-book methods are to be combined, but that discussion is always to be prominent, we proceed to consider how the latter might be conducted.

Safeguards against wandering in discussion.

Since, as declared above, it is by no means easy to lead a discussion properly, some of the general rules that would keep it within bounds and render it effective are necessary. The most serious danger is that *conversation may wander*, so that pupils will feel lost and nothing definite will be learned. But there are several important safeguards against this danger. The *first* is *a clearly defined aim* stated to the class. If both teacher and pupils set out to reach an end definitely fixed, they are able to measure by it the relevancy of any thoughts suggested. Quite often the teacher can protect herself, when a child makes a suggestion without reference to the topic under treatment, by asking the class, "What did we set out to accomplish? Will the suggestion just given help toward that end?" If the class reply, "No," the difficulty is immediately overcome. Such treatment of wandering thoughts is very valuable, too, for thereby all the pupils are drilled in measuring the relevancy of their ideas. They are trained to select with care the suggestions that may prove helpful — thus their judgment is exercised by a study of relative values; hence a clearly stated aim is of worth whether we wish to occupy only ten minutes or a whole recitation period in developing one or more thoughts.

Aside from an aim, the teacher will also be greatly aided by a *clear outline* of her *pivotal questions*. If she realizes what her two or three or four main problems are for a thirty-minute period, she has practically three or four sub-aims in mind, and they will keep her upon the right road in the subdivisions of the recitation, just as the large aim for the entire period guides her for the whole recitation. A clear statement of the leading questions on a given subject is essential to the fullest preparation for teaching it. Very often good instructors prepare for class work by arranging their subject-matter in topics and designating each by an appropriate heading. But a great amount of indefiniteness may be concealed under mere headings. The division of a subject into topics, with a suitable name for each, can be made by one who possesses no skill whatever as a teacher; but the proper wording of the corresponding questions that would actually be put in class cannot be given by such a person — that requires an intimate knowledge of children's interests, of their vocabulary, etc. This means that the method of treating a subject has not yet been determined when one has decided only upon his topics. Training teachers in the model departments of normal schools receive remarkably little information about the actual method to be employed by student teachers, when the latter present to them only a careful outline of the subject-matter to be taught. The difficulty here involved has been already suggested in the discussion of the aim of the recitation. In that connection it was stated that the aim might often take the form of a question or problem, and it was shown by example how difficult it was to find a suitable wording for it. But, as in the case of the aim, so here, the rightly worded question plants a topic within reach of the children, within their experience and interest. Here we see again how adjustment of the new to the old is secured.

An *example* may make the matter clearer. In the study of the sugar maple the chief headings might be *shape of tree, root, stem, leaves, etc.* Some of the minor ones might be the color and form of the leaves, the density of shade, the superiority of the hard maple over the soft maple, etc. But with such headings little preparation has been made for actual teaching, for no suggestion is given thus far as to how these matters will be broached in the presence of the children. Since the facts cannot best be told to them outright, some question must be conceived which will be broad enough to include several facts and sufficiently suggestive to provoke thought. Let this be the one: What reasons can you give why the hard maple, or sugar tree, is so well liked by us all? The replies will come that it is beautiful, the color of the leaves is so green; also, that the shape of the tree is pretty, it is so regular, or symmetrical. Further than that, on hot summer days it gives an excellent shade, denser than that of many trees, for instance, the soft maple. This is partly because the leaves grow on the stems in the middle of the tree, as well as outside where the sun can easily reach them. Also, the tree can endure more than many other trees. The wood is harder than that of the soft maple, hence the name *hard* maple; and the tree branches differently from the soft maple, so that heavy winds, sleet, etc., are less likely to break and tear it to pieces.

If this part of the recitation proves especially interesting and profitable, it is to a great degree because the leading question is broad enough to include several answers under it, and is so stated as to elicit much thinking.

Further questions might be the following: Where does the tree get its food? What part of the roots acts as mouths for receiving the food? If the little hairs are so important, what suggestion would you make about transplanting the trees? Where, then, could the water be best poured for watering trees? Why are these roots and rootlets so knotty and irregular? Where does this water go that enters the roots? Through what part of the trunk does it pass? Why are the leaves so thin and broad? How can the leaves prevent too much evaporation? Why are the petioles of different lengths?

The fact that it requires very careful thinking to word such questions as these, even after one is well acquainted with his subject-matter, is proof that they are an important advance upon the arrangement of a subject by mere headings. But the teacher who aproaches her class with that preparation, *i.e.* with her questions clearly marked out, is partly protected from wandering. A proper question requires a definite answer, while both the amount of matter included under a heading and its nature are uncertain. Consequently both teacher and pupil are more likely in the former than in the latter case to know when they are on the right track and when they have finished.

A third important safeguard against wandering is closely connected with this one. If the prominent questions that compose the outline form a *necessary sequence*, a teacher is much more likely to be reminded at the right time of what ought to come next than would otherwise be the case. A great law of teaching is here involved. Applied to the single recitation, it is often referred to as the *law of sequence*. According to it, a lesson is by no means fully prepared when the teacher has fixed in mind several topics that she wishes to cover; she may even have stated these topics in the form of definite questions; but preparation is still very defective unless these questions are brought into a very close sequence, either logical, or causal, or at least natural. In following the topical method in United States history, teachers often take the events of an administration as the chief points to be considered; but it happens not seldom that there is no close sequence between these points, and hence the law of sequence is violated. In the preceding examples of the developing plan of teaching, the leading questions in regard to England, and in regard to the sugar tree, were arranged, so far as possible, with reference to this principle.

Let another instance illustrate this point further. Suppose the fifth grade in geography has learned that a very large part of Spain consists of a plateau with low land around the edges; the series of questions following may form a close sequence. If the plateau is so high, what must be the effect upon the moisture-laden winds that rise over the edge of the plateau? Since a large portion of the rain will fall upon the edge of the plateau, what about the interior of this highland? If little rain falls upon the interior, what about the size of the rivers, the abundance of grass, of woods? If the rivers are small, etc., what about the population of the interior? It is plain how such a closely connected series prevents wandering; for, when it is once begun, it is very easy to proceed; each question reminds the teacher, and often the children, of the thought that should be next considered, and hence there is little temptation to wander.

Thus far *three* safeguards have been suggested to prevent the danger of wandering, *i.e. a clearly fixed aim*, *an outline of topics in form of questions*, and *a close sequence among the questions*. The presence of this aim and of such questions in sequence invites both teacher and pupils to measure the worth of all contributions from the latter and to reject what is irrelevant.

How reviews prevent wandering.

In addition to these three means of protection it is advisable to require frequent detailed reviews and summaries. The reviews might take place every ten or fifteen minutes, according to the ability of the class in this direction, and the summaries would come less often. Reviews and summaries call for reflection in regard to the ground that has been covered; and, if the conversation has been wandering, the participants are likely to be made conscious of the fact. The instructor, at least, will be placed upon her guard. They are made very easy, too, if, as important thoughts were presented, brief headings for the same were placed upon the board. Some of the better scholars should first be called upon to reproduce all that they can without interruption. Then, after necessary corrections are made, others should follow: thus the demands made upon each are tempered according to his strength.

Why summaries are especially important.

A very important principle of teaching is involved in such summaries, and it applies as much to text-book instruction as to the developing method. In each there is a tendency to become so immersed in details that general bearings and larger issues are lost. This is seen in history classes that take "seven pages in advance and seven in review," but never find time to do more than memorize each day's lesson; it is seen in all studies where the advance is so constant that students do not halt to breathe and look about them to see the main steps that they have taken. This principle is sometimes known as the law of *absorption and reflection*. According to that law there are two kinds of mental activity required in study. The student employs the first when he becomes absorbed in the study of individual facts. He gives himself to certain details to such an extent that attention is entirely withdrawn from other groups of ideas. He employs the second when he withdraws his attention from this one series of facts and directs it to a much wider range of thought; when he rises high enough to take a broad survey of the field that he is studying and to see the relationship of principal topics to one another.

In travelling one often crosses a valley, then ascends a hill; one crosses another valley, and then ascends a mountain, etc. There are heights and depths in study as well as in travel. The student should plunge into details, and he should rise again to a point where he can see the ground that he has covered, both that of the day, and often that of the preceding week, or month, or term; that is, he should rise to a point where he can secure a broad view. In other words, he should have periods of absorption and of reflection, and these two should alternate just as do hills and valleys. In any recitation period provision should be made for this variety of thinking, so that after a very careful study of details a general survey of the whole may be secured. Summaries should be planned in accordance with this demand. If the class is making rapid progress, there could well be two or three summaries within thirty minutes as the outcome of more detailed reviews. By that means children obtain a frequent view of a long stretch of the road that they are pursuing, and thus keep in mind both the general direction in which they are travelling and the principal points passed.

This law of absorption and reflection is sometimes called the law of *mental respiration.* Just as we alternately inspire air and then expel it, so absorption in details and reflection in regard to them should alternate. The perspective thus secured affords valuable aid in the proper classification of one's knowledge. If, after having studied for fifteen minutes, a pupil is required to give a heading for the matter covered and to recall the gist of the thought; and if the same thing is done for the work of the hour as a whole, for that of the week, month, etc., — if this is done, he is allowed to withdraw far enough from particular facts to distinguish which are relatively unimportant and which are of the greatest value. Ordinarily in the progress of the study of details there is not sufficient opportunity given to distinguish their relative values. Children are too immediately occupied with them, that is, they are too close to them. But when at frequent intervals pupils look over the territory travelled, they have an excellent opportunity to view the different points in the right proportion. Thus we see that the classification of knowledge is secured and the danger of wandering avoided by the application of this law of absorption and reflection.

Danger of guessing, and the remedy.

But in all teaching where attempts are made to dispense, to a considerable degree, with text-books, there is danger of trying to develop things that can never be developed. For instance, suppose that a teacher remarks to a class, "Let us talk about a certain bird. Can you tell me what one I have in mind?" In that case she is putting to the children a question that they have no means of answering. They may name all the birds they know and finally hit the right one; but it is not instruction in which anything is unfolded or developed; it is no real instruction at all, but only an injurious exercise in *guessing*. But the conversational plan of teaching aims to develop the *judgment* of pupils; hence the questions asked must be of such a nature that they may reasonably be expected to answer them. If the teacher asks the third grade in what manner Crusoe might salt the rabbit that he caught, she should do so with the belief that a reasonable amount of thinking on their part will produce a certain reasonable reply. To be sure, they know nothing about any salt mine on the island, but they know that the sea is salt, and if some one replies, as was the case in one class, that Robinson would dip his meat into the salt sea, or that he would allow some sea water to evaporate and use the salt left, the answers should not be unexpected by the instructor. But when pupils lack data from which to draw a reasonable answer, the question should not be given. As a rule, no answer should be tolerated for which a fairly good reason cannot be offered. We see, then, that the developing plan is dangerous in that it very easily encourages the tendency to guess, and thereby encourages thoughtlessness instead of good sense. Where teachers are in much doubt as to the possibility of developing a thought, the safer plan by far is to tell it frankly or approach it through a lesson assigned in a book.

Precaution against attempting to develop too much.

A careful study of children will gradually reveal to the teacher what is probably capable of development. In times past teachers have undoubtedly erred in supposing that almost everything new must be given to the child in order to be comprehended and learned; hence their immediate resort to "telling" and to text-books. It has been the intention in the numerous examples given above to show that much can be unfolded through conversation, but not all. In connection with England the fact was given that an abundance of coal and iron ore was found in that country. That being the case, it was asked what might follow. The children, knowing that Crusoe had been shipwrecked and lay senseless upon an island, were asked what he would be likely to say and do when he came to his senses and stood upon his feet. It was told to the class that a hill unoccupied by either the British or the Americans overlooked the city of Boston, and the children were asked to suggest the plan that might occur to the Americans in regard to it. Thus, even in these instances, although many things can be developed, some must be told. In other topics it is often necessary to tell much more or to make much use of the text-book. In all studies the teacher must see that the children are brought into possession of the necessary facts, before they are required to put these facts together in order to work out a solution. It is a shrewd teacher who can discriminate between those truths that are necessarily preliminary to the problem, and those that can be reasoned out. But he who disregards this distinction is in danger of making a farce of development work. Aside from all this, it is well to remember that some subjects, such as beginning reading, writing, and spelling, are arbitrary or conventional in nature, and on that account allow only a small amount of development.

Although it is often declared that the world has made its progress by passing from one extreme to another, yet we should guard against going from the old plan of telling all to the new plan of developing all. This precaution is all the more important when the fact is recalled that the new convert to the development method usually makes too much use of it.

Is this method too slow?

Some teachers oppose the conversational method, in whole or in part, because it consumes a great deal of time, or *is too slow*. They argue that so short a time is spent in school that it is necessary to cover ground much more rapidly. But let us see what are the causes of this slowness. In the *first* place, as we have seen, the children themselves are to conceive some of the problems from day to day in each study, and they are to find solutions for a large number of them. The law of self-activity requires that they do this work rather than have it done for them. Hence, although it occupies much time, it cannot properly be omitted. — *Second*, the developing plan of teaching allows the expression of any doubts, misconceptions, objections, etc., on the part of the children or students. These need to be satisfied, or shown to be false. That also takes time, but the law of apperception requires time for such things, in order that the new may really be welded to the old in a proper way. The destruction of wrong notions is just as necessary a part of good instruction as the presentation of correct ones, although the former is not usually summed up among the positive benefits of a recitation. Hence, while such discussion occupies much time, it also cannot properly be omitted. — *Third*, the developing plan requires that many links be inserted in the chain of thought that would be ordinarily presented, so that there may not be any broad chasm between any two points. The law of close connection or close sequence in thought requires the insertion of many facts, so as to present a situation that is fully and easily comprehended. Hence, although this also requires much time, it cannot properly be omitted.

We see, then, why the developing plan of teaching requires much time, for these points mentioned cover the chief characteristics of that method. But which one of them ought to be omitted in order to save time and cover ground more rapidly? If no omissions are in place, then the method is not too slow.

To be sure, compared with the progress ordinarily

What thoroughness means, and how to secure it.

made by the text-book method, this other way is extremely slow. But any one will admit that ordinarily we pass over subject-matter altogether too rapidly, and we should bear in mind that real progress is to be measured not by the ground apparently covered, but rather by what the child actually gets in such a way as to make it his own. Teachers are too often inclined to hurry, measuring their progress by the amount covered; but if the rate of progress were determined by what the child really digests, we should necessarily proceed very much slower, for it takes a large amount of time properly to digest a single important thought. This can be seen from the fact that there are several stages in the assimilation of a thought. First, it must be seen clearly from a single side, then it can be recalled by the memory with some effort. After it has been seen from several sides, however, one really begins to feel the force of it; then it can be recalled by the memory with some ease. Only after it has been seen from many sides are we able to recall it with such ease and feel its force to such a degree that we can begin to use it, and it is even some time after that before we begin to use it with ease and feel that it is fully our own. Now, much instruction consists in giving a single view of an important thought. That is seen in lectures. A lecturer often presents a thought clearly in a few sentences, and then moves on. An attentive audience sees the thought clearly for an instant, and then something else takes its place, and the great danger is that even in an excellent lecture one will be given only glimpses of fine things. But the only condition under which any topic is really digested is that the mind dwell upon it for a long time. It must be looked at from one side, and then another, and then another. It must be reflected upon at length, in order that one may become saturated with it so that it seems a part of him.

The developing plan of teaching, by allowing different persons to be heard from and to express their thoughts from different points of view, provides the necessary time for the mind to dwell upon a matter and see it in various lights; in other words, it provides for real digestion of thoughts. When we reflect that probably *nine-tenths* of the information acquired in school is forgotten, and that only a portion of the remaining one-tenth has really been digested in such a way as to be a power within us, the need of a slower method of instruction becomes apparent. If we were to cover ground one-half as fast, and spend twice as much thought upon a topic, we should learn much more effectively than we do at present. Enlightened teachers generally admit this statement as a fact, but they are controlled by the habits of the past when it comes to actual instruction. It must be acknowledged that the developing method is slow, but that is the kind of method that both children and teachers need. Since the ordinary tendency is to cover ground altogether too rapidly, any method which puts a check upon teachers and secures greater thoroughness is to be welcomed.

Final advice in regard to use of development method.

The main objections that have been stated to an abundance of discussion in classes of all ages are three, *i.e. the tendencies to wander*, *to guess*, and *to progress too slowly*. Although there are means of overcoming them, the objections are sufficiently weighty to prevent the majority of teachers from depending mainly upon conversation as a means of reaching new knowledge.

A few instructors can limit themselves almost wholly to that method, at least in some subjects, and make their nearest approach to ideal teaching. But such effective work is the result of much native ability and extensive experience, as said before. It is wise for the majority to depend in large measure upon text-books in most studies. But in no branch should a text be so closely followed that the recitation period is spent simply in reproducing the contents of a book ; that is slavish work, taxing chiefly the memory and giving no guarantee of real assimilation. Even where the book is in regular use, some of its statements can well be anticipated and developed by conversation before they are assigned in the book itself. This can often be done in the assignment of the lesson. Many other statements need to be followed out in detail far beyond the meagre account in the text. Hence, even where the book is used, the recitation period should be occupied, not with catechetical questions on the text, but with discussions either of problems whose solution will be found in the text later, or of statements already met there, but needing much amplification in order to be appreciated.

Kind of questions to be put.

Since discussion is to play so prominent a part in all good teaching, it is well to realize that the skill required in conducting it is shown first of all in the value of the questions asked. It is necessary, therefore, for the ambitious teacher to become a careful student of the *art of questioning*. Especially must she consider the purpose of the questions. Ordinarily they aim merely to test the presence of knowledge supposed to be already acquired in the lesson assigned, as map questions in geography. But those necessary in the developing method cannot aim primarily to test memory in this way; they must provoke thought first of all. Hence, instead of catechetical questions, or others that can be fully answered by a yes or a no, or by memorized statements in the book, those are to be put which are suggestive enough to arouse thought and broad enough to call for even a series of thoughts. The preceding pages offer numercus examples of this kind. One of their merits is that, while they provoke or stimulate thought, they at the same time test the presence of knowledge. Socrates resorts continually to questions that fulfil this double function. In his conversations with young men he tests what they know while spurring them on to the most careful thinking.

Vivid mental pictures and one means of securing them.

Throughout this chapter we have been considering the method of presenting new individual notions or concrete facts. One object is to offer them in such a manner that a vivid picture will be produced and a deep interest be aroused. This demand for *vividness* should ever be borne in mind by the teacher. Children should practically see Minneapolis with its waterfall and flour mills, with its wheat fields to the west, and its farm products of all kinds coming and going. Likewise Midas, and his little daughter coming to kiss him in the early morning, should stand out distinctly before them; so the different stages in the lives of certain insects should be accurately pictured; and the several colonies quarrelling and fighting with one another after the Revolution, should appear almost as clearly as disagreements on the playground are recalled. The developing method, with its searching, thought-provoking questions, is to be applied to this end. But other means, also, are to be kept in mind. One of them has already received emphasis; namely, the past related experiences. Indeed, the developing method is made possible only through these.

In addition to these means it is important to *produce in class*, so far as possible, *the object talked about.* It has taken centuries of progress to realize this need. During many generations following Columbus's discovery of America people had an unlimited faith in the power of words, whether the words represented familiar ideas or not. They were as far removed from the use of objects as they could possibly be. They even ignored the mother-tongue in approaching a foreign language, learning Latin through a grammar that was entirely in the Latin language. Finally Comenius advocated pictures illustrating the idea symbolized by the word, and in consequence his "Orbus Pictus," or picture book, issued in 1657, became one of the most noted school books ever published. By the help of such illustrations one could get some notion of the object mentioned, even though he had never seen it.

Another century passed before Pestalozzi was born, who partially convinced the world that even pictures were inadequate and that teachers must make it their practice either to bring things into the schoolroom to be studied, or to take the children out to see them. The lesson is not yet half learned, but here and there are instructors who do regularly bring insects and flowers into the school, who visit museums with their classes, and even go on lengthy excursions with them. They aim to make not only their nature study but other studies concrete thereby; they visit museums to see historical relics; they make excursions to see actual valleys; they use objects to show how real fractional units can be added; they do all this in order to secure living pictures of what is studied. There is as much difference between seeing a thing and merely hearing about it, as there is between visiting Paris and listening to a description of it.

Substitutes for the real object.

But unfortunately it is often impossible to see and handle the objects themselves. In that case there are several partial substitutes; among them are models, maps, photographs, and lantern slides. Any school could make a valuable collection of pictures by simply cutting them out of newspapers and magazines; thus water-falls, industries, beautiful views, etc., could be presented in concrete form.

But there is *another substitute* for the real object that is especially worthy of mention; it is *an abundance of details*. To be sure, there is often a strong objection to them, for there is a kind of details that is a useless burden: the dates of most battles, the number of men engaged in them, the bends in a river, the exact height of mountains, the several uses of the present active participle, the number of seeds in an apple, the degree of longitude in which most towns on the earth are situated, are fair examples. These are not the kind meant. There is another kind that is really essential, and it is illustrated in the story of Crusoe, where little incidents are related without number in order to build up a vivid picture; they are necessary to the comprehension of Minneapolis as a trade centre, for one must know the kinds of grain shipped into the city, the many railroads carrying it, the numerous flour mills with their capacity, etc., before he begins to see what is meant by trade centre. Many detailed events in the life of the milkweed butterfly are likewise necessary before one can get a right conception of its metamorphosis.

Need of well-chosen details.

In tracing the origin of our constitution it is insufficient to read that New York, New Jersey, and Connecticut fell into disputes and threatened war. We want to know what they quarrelled about. So it is not enough to call attention merely to the fact that there was no national coinage, and hence that trade was hindered; we should like to see in detail some of the ways in which it was hindered. Only by the help of abundant little facts are we likely to enter into the spirit of such situations and understand them properly. These details are trivial in themselves, to be sure; but it is through them that the child becomes so absorbed in a subject that he fails to hear you when you speak to him; it is through them that he approaches *perfection of understanding and interest.* The point to be emphasized is the selection of the right kind. Those should be chosen that are essential to a clear, attractive, and correct picture. Those that are irrelevant to this end should be cast aside. The biographer omits many incidents in the life of his hero, because they contribute little to any important purpose, but he depends upon others to make important characteristics clear and to render the biography attractive. The popularity of Fiske's

"Critical Period in American History" is due largely to its exciting details. As said, then, the *first precaution* to exercise is to *select the details with care.* This being recognized, the *next* should be to *provide an abundance of them.* Meagre data can never produce a complete notion, but a great number of them, well chosen, can make permanent impressions.

Motor activity as a means of securing vivid impressions.

The vividness of mental pictures is dependent finally upon the extent to which thoughts are allowed to find expression in *physical action.* During the first six years of life the child acquires a large share of his education. Each year he probably learns more than he does during any later year of life, not excepting his college course. What are the means by which this great result is brought about? Two characteristics of these six years are especially noticeable. One is that he is almost constantly employing his mind. He propounds questions, finds their solution, makes observations of various kinds, etc. But during all this time his motor activity is as striking as his mental life. He is using his back, neck, legs, arms, hands, etc., as freely as his mind. Undoubtedly it is natural for him to do so. He is so constituted that if he did not exercise he would scarcely be able to contain himself. Hence such physical action may be considered restful. But it is more than that. It is not a wasteful activity that merely accompanies mental action, in an unrelated way, but it aids this action, it helps toward clearness of ideas. By dramatizing the scenes that he pictures, by doing and making the things that he imagines, he uses two means of expression rather than one; namely, words and actions, and he experiences a richer spiritual life in consequence.

All this being true, when the six-year-old boy enters school, what conception should be entertained of his work there? Is it to be his occupation to sit still and think? Or at best, does learning consist for him in thinking, in free exercise of the muscles of the tongue, and of those of the hand and arm in writing and figuring? If an abundance of physical activity was characteristic of those years when he learned so much, and if it was a necessary means to that end, why should not provision be made for it in the school? Why should not the method of teaching, throughout the grades, provide for plenty of motor activity, whose immediate purpose shall be to contribute to vivid imaging and to mental growth?

But how can this arrangement be effected? In the *first* place, one can plan to *employ the hand* in many kinds of subjects. For instance, if drawing is begun with school life, children can learn to express their thoughts as freely with chalk as with words; they will illustrate Hiawatha's fight with the sturgeon, or the interior of a coal mine, without the slightest hesitation. They not only can be made willing to step to the board when asked, but if they happen to be near the board they will step to it unconsciously when words seem to be inadequate to express the idea. This result, too, can be brought about not by skilled instruction in technical drawing, but merely by daily practice from the beginning in expressing all kinds of thoughts with chalk as well as with words.

Schools are already somewhat numerous in which this kind of work is done, and their number can be multiplied. The hands can be further employed in shaping clay to represent such objects as an Eskimo hut, or in using sand in geography work, or in painting a beautiful sunset, or in making objects out of paper or pasteboard or wood. The thoughts represented by such objects can, of course, be expressed in words, but if in addition to that they are told through the work of the hand, clearer perceptions are obtained.

In the *second* place it is often just as easy to *employ the whole body* as the hand in this expressive action. For instance, it is well in geography for a pupil, instead of saying simply that London is northeast of New York, to point toward it, or, better still, to walk toward it. It would be in place occasionally to have a walking exercise in the geography with such questions as the following: Let us now suppose ourselves in Paris, will you walk toward London? Walk toward St. Louis. Toward Rome. Again, we are now in St. Petersburg, will you walk toward Buffalo? Toward London, etc.? The entire class may be asked to face St. Louis, to face Duluth, Cincinnati, etc. During this exercise there is no need of words on the part of the pupils, they can answer the questions by their physical actions. Thus a pleasant variety is brought into the work, and it is a more thorough way of answering the questions put than the ordinary way. The author has often found that both children and teachers who know the directions in their locality and who can *tell* the direction of Philadelphia from their home, must hesitate before they can walk toward Philadelphia. Without doubt this is due partly to the novelty of the request, but it is also due to the fact that a fuller realization of the direction is required in order to walk toward a point, and many people are not accustomed to mental imaging vivid enough to meet the demand immediately.

In primary reading there is no reason why a child should always show that he comprehends a thought by expressing it in words. If he has just read the sentence, "The door was opened," he can himself quietly perform that action; many good teachers adopt this device. In several studies it is possible to act out scenes in some detail. This is especially true of literature and history. In studying the life of Columbus, young people can represent how Columbus appeared before Queen Isabella, and reproduce the supposed conversation between him and the wise men of Spain. To do this is plainly an additional requirement beyond recalling the narrative from memory, but it is done in some schools, and where it is done properly, vivid picturing is secured. The author is acquainted with a third grade that had an interesting experience of this kind in the story of Robinson Crusoe. When the point was reached in the narrative where Robinson was to teach Friday the English language, Margaret was asked to represent Robinson, and Richard, Friday. They stepped out before the class, and after a moment's hesitation, Margaret began beating herself on the breast and shouting to Friday, "I, I am Robinson, Robinson," then she pointed to Friday and said, "You, Friday; you, Friday." This was done several times, but Friday understood his rôle sufficiently well to grin discouragingly and make a grunting noise. Margaret then saw that her plan was not succeeding and concluded to try another. Casting her eyes about her, she spied the sand table near by, and seizing Friday by the hand she hurried him to it, plunged her hand into the sand and shouted, "Sand, sand," making motions. She forced him also to take some sand into his hand, and speaking the word herself, she required him to make the same sound. He attempted it and succeeded fairly well. From that time on Friday seemed to have the idea, progress was more rapid, and in a few more minutes several words were taught.

In literature and history it is very often possible to find a portion of a narrative which can be nicely illustrated in this way. Of course there is unnecessary loss of time if much care is taken to give regular drill in presenting a given scene. What is required is simply impromptu representation of any scene, nothing more.

Proof of value of motor activity.

One proof that such teaching secures especially vivid pictures is the fact that children taught in this way are peculiarly free from self-consciousness; that is, they must so fully enter into the spirit of situations that they forget themselves. This is a matter worthy of careful consideration on the part of teachers. Further than that, by acting out thoughts children really get possession of knowledge more fully. If instead of ending with words in regard to a topic, they close with actions, they feel that the ideas are more fully their possession, which means that they feel *self-confidence* in regard to their knowledge. The presence of such self-confidence is itself another proof that the picturing is vivid, for this confidence is lacking where situations are not clearly imaged. It is, therefore, an important test of method to inquire to what extent the teacher provides for motor activity as a means of producing vivid impressions.

There are, then, *four prominent factors* to be attended to when *vivid picturing* is desired: past related experiences are to be appealed to in abundance; the objects studied are, just as far as possible, to be seen and handled; a large number of carefully selected details are to be offered, and provision is to be made for physical expression of thought. By careful attention to these factors it is possible to present facts in such a manner that the pupil enters into their spirit so as to seem to experience them himself; he then feels himself among, or in the midst of them; or, in other words, is *interested* (*inter esse*, to be among or between or in the midst of). This interest is necessary if knowledge is to be really digested and become a source of power.

When review by repetition is in place.

The teacher's practice in regard to reviews is one very valuable test of his skill and insight. It was a favorite maxim of the Jesuits that, "Repetition is the mother of studies," and the extent to which they applied it is astonishing. Every lesson began with a review of the preceding lesson, and ended with the review of that which was just covered. Besides this, one day a week was devoted entirely to repetition. In the three lowest grades, also, the second half of each year was spent in reviewing what had been taught during the first half. Probably modern educators would agree with them in the importance that they attached to review; at least it should certainly occupy much time. But modern educators would disagree with them radically as to the way in which it should be conducted.

To-day *repetition* and *review* are by no means fully synonymous terms. On some occasions mere repetition, or reproduction of thoughts substantially in the way in which they were first taught, is entirely in place. For instance, the one, two, or three reviews and summaries that have been suggested (p. 152) as desirable in each recitation may practically amount to a repetition of the facts presented. Such repetition may also be in place at the beginning of a recitation when work is called for that was accomplished on the previous day. It is advisable to recall subject-matter for a few times in much the same manner in which it was originally taught; that is, practically the same questions and the same answers may be repeated until facts become well fixed for the first time.

Wherein review by repetition is weak.

But before knowledge is really digested, it is necessary to fix it in mind *many times*. Mere repetition cannot do this in the right way; what is needed is a new adjustment of a thought to our usual way of thinking, then another and another, etc., until it becomes welded to our personality *on many sides*. Repetition usually signifies verbatim reproduction; or, if not that, something so closely akin to it that mainly *memory*, and not *reason*, is appealed to. It requires that the same route be followed that was originally travelled, and hence always approaches knowledge from the same side. This is what the Jesuits did, and it is largely what was done in the term reviews so common in this country only a few years ago. It was the custom then to set aside the last two or three weeks of the term for a review of all the matter that had been taught during the term. This was the practice not only in the common schools, but in the normals and colleges as well. On such occasions so much was assigned for each lesson that there was no hope of studying it so thoroughly as the first time it was covered. Indeed, that was not the object; the aim was rather to take a rapid view of all the ground traversed in the belief that one more look, though not a careful one, would greatly aid in fixing the facts permanently in mind. It was mainly a hurried repetition. But what stultifying work! Two, three weeks consumed at the close of each term without pretence of reaching new thoughts, or of reviewing old ones in a new light, but with the sole object of *impressing the memory!* There was certainly no inspiration to the pupil in that kind of work, or to the teacher, either. But, aside from that, there was little profit for the pains; the aim was a narrow one, and it was very poorly attained. When a review degenerates into a mere drill by repeating knowledge in the same form in which it was first acquired, it makes little impression upon the memory itself, and the hammering must be kept up a long while before it will tell. It was a narrow aim, too, because even after one has learned a thing so well that he can say it in his sleep, he has no proof that he knows it so thoroughly that he will be conscious that he has it when it is needed. The world is full of people who need to be told when to use their knowledge, even though they have learned it by heart.

Purpose and nature of the principal kind of review.

Reviews should aim to be much more than mere drills for the memory. They should aim to put the child into the possession *of facts for use by causing him to approach them from as many sides as possible.* No one who has thought of a point in only one way has real control of it; if he has repeated it a great many times, he has perhaps fallen into a rut rather than gotten a broad understanding of it. The world does not necessarily, in fact does not usually, adopt the one approach to a thought that was taught in school; hence, the school should prepare for the world by leading the pupil to one point from many directions. Repetition is then only one kind of review, and an exceedingly narrow one at that.

Reviews in the main should mean a new view of an old thought, or a view from a new position. This kind has already been partly provided for by the preceding step, for, in the acquisition of individual notions, it was shown to be important to collect the past related experiences. Such a review can be further secured in the presentation of the new material, provided teachers can find sufficient energy to throw away questions that have become somewhat worn from use, and think new ones. Any important topic, when once taught, should be recalled many and many times, and the questions referring to it should be stated in all possible forms, so that it can be seen from one side, then another, and another, etc. A mountain does not appear the same on one side as on another, and he who has observed it closely from one point may fail entirely to recognize it when viewed from a different position. The same is true of objects of knowledge in all subjects.

It often happens that a mere change of the wording of the question utterly confuses an intelligent class. The author was once acquainted with a senior class in a state university who, in their study of pedagogy, had reached the conclusion that the development of good character was the chief purpose of the public school. The matter had been discussed at length until they seemed clear in their conception of good character and well grounded in their reasons for giving it such prominence. One day shortly after this result had been reached, the statement was made to them, "The superintendent of schools of one of our largest cities recently remarked that the chief object of the first three years of school is to teach children to read. Would you agree with him or not?" The reply came unanimously that they would. The matter was then carefully discussed, and they saw that in this case the acquisition of knowledge was set up as the highest purpose of the primary grades while they had asserted that it should be the development of character. They acknowledged their inconsistency and withdrew their assent to the superintendent's remark.

Again soon afterward they were tested on the same point, as follows: "A mother often says to her little child, 'Did you have your reading lesson to-day?' And if she is convinced that he did have it, she feels quite satisfied as to the success of the school so far as her child is concerned. Is she quite right?" The reply came that she was, in spite of previous conclusions to the contrary.[1]

These are merely examples showing how, after a question had been settled not only *once* but even *several* times, a query somewhat different from those already presented will prove that it is not yet by any means really settled or brought into relation to other kinds of experience. It is largely because matters have been reviewed in only one way, from one point of view, that strangers, who have different ways of looking at things from the teacher, receive no replies, or

[1] The author was recently discussing the relative value of studies with a class of twenty-five persons who averaged about ten years of experience in teaching. Nearly one entire recitation period was devoted to that topic. It was the custom of the class to receive a few questions, at the beginning of each hour, that bore upon any of the preceding work of the year. Accordingly the next day after the recitation mentioned the question put was, Have we at any time during this year discussed the problem, What knowledge is of most worth? The unanimous reply was that we had never considered it. In like manner children often "haven't yet had" a topic which has already been "had" and finished by them.

very ridiculous ones, when examining school children. If there were usually an *element of newness* in the reviews, so that they might be distinguished from mere drills and repetitions by *taxing the thinking power*, they would prove *more interesting* and thereby make a deeper impression upon the memory; they would also lead to *greater thoroughness* of knowledge and thus largely eliminate such discouraging answers as the above.

Amount of time for review.

There is no desire expressed here to diminish the amount of time devoted to reviews. The great danger is that they will receive altogether too little rather than too much attention. On the average probably from one-third to one-half of the time in school should be spent in considering topics that have already been studied. It occupies much time to recall the old related experiences in approaching a new topic and in following the developing method; it consumes much more, as will appear later, to compare facts already studied, with the object of finding similarities and differences and essentials; it takes more still to review old knowledge by applying it, until it becomes one's own; when all this is done and when, in addition to it, time has been taken for proper repetition, and for review by numerous questions put from new points of view, one will find that easily one-half of the teaching time has been consumed. But the *time for review should not come mainly toward the close of the term* — it should be distributed throughout the term, every recitation containing some of it. Only in that way can a student become so familiar with thoughts that he has his bearings in regard to them, no matter from what side he may be approached.

Assignment of lesson.

One of the important parts of any recitation consists in the assignment of the lesson for the next day, In case the developing method is employed, the aim of the next period should be clearly stated in the latter part of the recitation, and when the next period arrives, that aim should be recalled. In the meantime the pupils can be held for careful reflection on what was last accomplished, so as to reproduce it correctly and with ease.

In case a text-book is used, sufficient time should be taken toward the close of each recitation to state the aim for the next period, and to allow at least the preparatory step, so that the class may approach the text at home in an apperceiving mood. It is important that this preparation be completed before the text itself be discussed.

But whatever method be employed, all that has been heretofore said about the importance of fixing a definite aim applies to the assignment of the next lesson. If a clearly defined object is a necessary condition of valuable study in the presence of the teacher and with his help, it is all the more evident that when left to study at home by themselves children will waste much of their time unless guided by a clearly defined purpose in each lesson.

Amount of time necessary for the second stage.

The time necessary for the second step varies indefinitely. Sometimes it may not occupy more than fifteen minutes. But when it is remembered that it deals with individual notions and must furnish as many of them as are necessary, as data, for reaching a generalization, often a broad one too, it is evident that it may occupy many recitation periods. Eight or ten recitations are usually required to teach the story of the Discontented Pine Tree. One period is necessary for the first step, then five or six for the narrative itself or the second step, and the other three for the general truth and its application. It would take fully as much time for the Golden Touch in the third or fourth grade. Several individual trade centres should be studied somewhat in detail before the generalization, trade centre, could be reached. Minneapolis as the first example, and a type, might require two weeks, although the others could be taught in much less time.

In order to realize that all sections of our country must be firmly united under one central government, very many data are necessary. A careful treatment of those given in Chapter II could easily occupy two months in the sixth grade.

Requirements from the teacher.

The successful treatment of these concrete data makes a great demand upon the teacher. In order to excite deep interest among her children in her subject-matter, she herself must be deeply interested in it. As she approaches the class she *must feel that she* *has something valuable to give* them, something that they will value highly as well as she. How little this is the case with many common topics, as person, voice, and case in grammar; the location of cities in geography; the teaching of the several cases in percentage, etc.! The first demand on the teacher is, then, that she *know her subject thoroughly and feel its richness.* But far beyond that, she must have *prepared each lesson* with much care before she can hope to provoke free, pointed discussion, of such quality that good summaries will be given in the natural language of the child.

This is the ideal, which can never be fully attained. But it can at least be approached; and there is the consolation, too, in case of failures, that constant, earnest practice will rapidly render a near approach to it more and more easy.

Summary. In the last two chapters a large number of factors have been considered that are important in the preparation for, and presentation of, individual notions. The first great question was, How should individual notions be approached? The answer, was that the past experiences, related closely to a given topic, should be called to mind in abundance; the method of doing that received much attention. The second great question, How should individual notions be presented? has now been discussed at length. This completes our consideration of individual notions. It is evident that there are two steps in their mastery; first, the step in which the mind is prepared for the new concrete matter; and, second, that in which the latter is presented. These will often be referred to in the future as the *first and second steps of* instruction.

CHAPTER VIII

HOW PROCEED FROM INDIVIDUAL TO GENERAL NOTIONS

INSTRUCTION often ceases at this point as though all was finished when individual notions have been acquired. This is the case in much of history and geography; that is, in these subjects there is often little more done than to collect a mass of facts about individual men, battles, administrations, cities, mountains, rivers, etc. But we have seen that percepts without concepts are blind, they give no insight into general truths and laws. Sense impressions, vivid concrete pictures or percepts, are only the starting-point in instruction; its end has not been reached until these concrete data have been sifted and fully interpreted. We have thus far, as it were, merely collected the material out of which to build some structure; just what kind it shall be is not yet determined; it now remains to look over the many things with care, to see what can best be made out of them. Or we have thus far only gotten together in piles the books which are to constitute our library; the usefulness of the same will now depend upon the

A starting-point for general notions in concrete material.

care that is taken in sorting, arranging, and indexing them. Hence there is much work still to be done.

It might happen that the mere sight of building materials would hint at the best use to which they might be put. So in instruction it can happen that the concrete data immediately suggest the large truth that they are intended to teach. This is the case with the Golden Touch. The experiences of Midas, his repentance, etc., are not peculiar to the king alone. The child quickly feels that Midas is typical of many people, and that, if their selfish wishes were granted they, too, like him, would be grievously disappointed. Thus a glimpse is caught of the general truth, the universal application.

How a full view of general notions may be secured.

But is it not important to catch more than a *glimpse* of such a weighty truth? Should not a *full view* of it be obtained by bringing together those facts within this narrative that point to it, and also by calling to mind other stories and any actual experiences of life that teach the same thought? Baucis and Philemon had their wish; did they choose more or less wisely than Midas? Why? In what respects was Solomon's choice a wise one? How did Midas overestimate the value of money? What use did Robinson Crusoe make of his bag of money when upon the island? Why? Such comparisons and questions bring the chief thought into full view until it can be stated in words, and they do it in such a way as to establish a conviction.

Any student of United States history necessarily becomes acquainted with some of the sad results of our want of unity during the Revolutionary War and the years immediately following; but because the instruction is not planned to teach convincingly that our states must be united, no intelligent conviction in regard to that matter is established; some of the most valuable data are omitted entirely, and those that are furnished by the book and teacher are not so massed as to point inevitably to close union as the solution of the many difficulties.

Geography contains almost an overplus of concrete facts, but too often instruction stops with them, and the result is that only a vague conception is given of trade centre, manufacturing country, canal, harbor, mountain, beautiful view, etc. Beyond doubt the defect is due partly to the fact that individual trade centres, harbors, mountains, etc., are not studied in such detail as to furnish the accurate facts necessary for a fairly correct concept. Some idea of the number of details required for that purpose was given in connection with Minneapolis. But the defect is due also to the fact that such concrete data as are studied are not brought together and compared. Minneapolis and the other cities along the Mississippi River that were mentioned represent only one kind of trade centre. Minneapolis is an excellent type of our large Western cities that deal largely in grain and lumber, and ship goods in and out by rail. But all centres of trade do not handle mainly these goods, nor depend so fully upon railways. Buffalo adds coal and live stock to the articles mentioned, and waterways by the Great Lakes and Erie Canal. Pittsburg deals largely in iron products, London in wines, fruits, iron goods, etc. A glimpse of the characteristics necessary to a trade centre is furnished by a study of Minneapolis alone. But in this case, as in that of Midas, more than a glimpse is wanted; and it can be gotten by comparing facts along the same line learned from other sources. In this case several great cities should be carefully compared in order to reach a clear conception of trade centre.

How a single case is misleading.

One can get only a faulty conception of the general notion of *valley* by observing one valley. It is customary in good schools to examine a neighboring valley, estimating its length, breadth, etc. But it is usually so narrow that one can throw across, or at least see across it. It gives scarcely a suggestion of the great Mississippi Valley. Many a child, who can define this word and illustrate what he means, is mystified by being assured that he himself lives in the Mississippi Valley, for he has never even seen that river. So the worded definition fails of interpretation until numerous valleys of various sizes and characteristics are studied and compared.

Danger of stopping short of general truths.

These instances show that it is unsafe to stop short of the abstract truths, the rules, laws, or definitions. When one has presented only the individual notions he has, as it were, what he knows to be valuable gold ore in his possession. But the latter must be refined before it can be brought into relation to human needs, before it can be used; so with knowledge; the non-essentials that are mixed with the essentials in concrete facts must be separated from these before the latter can become adapted to our use. That itself is a very important part of instruction. In arithmetic it is not left to one or a few examples worked to suggest of themselves the arithmetical rule; that would involve too much risk. It is a matter of vital importance to compare the steps taken in adding different groups of fractions in order to discover what must always be done, *i.e.* what the rule is. This is the case, too, in all study. The first and second great steps of instruction give command at best of well-arranged series of individual facts; from these the general truths are still to be drawn; and unless this is done the instruction of the teacher is, as a rule, largely in vain. So far as knowledge is concerned, general truths are the teacher's harvest; just as the reaping and threshing of wheat are essential parts of wheat raising so the careful reaching of generalizations is an essential part of good instruction.

While the acquisition of concrete facts may be regarded as a single large step, it was found to consist of two minor acts, each of which involved a large number of valuable considerations. So the progress from individual to general notions is not simple; enough has been said to indicate that the individuals must be compared in order to discover in what respects they are alike and what properties are essential to all; then must follow a collection of the essential characteristics of the class and an expression of the same in words in the form of a definition, maxim, or proverb, etc. Hence, there may be said to be two stages in proceeding from individual to general notions: one, the stage of *comparison* and *abstraction*, the other, of *definition;* the former would then be the third, the latter the fourth step in the mastery of general notions, since, as shown above, two are necessary in acquiring the concrete data.

Two steps in generalization.

Third Step

Comparison presupposes a knowledge of things to be compared; one cannot well hunt out resemblances and differences among objects before these themselves have been separately studied. The argument for this statement is well worth thinking out, it would require too much space to be presented here. The opposite practice is quite common.

The extent to which the comparison is carried must depend upon the number and nature of the data furnished through the second step, or through other similar experiences acquired either in or outside of school. Few problems involving addition of fractions need be solved before their comparison can

The ease or difficulty of reaching generalizations.

take place with the view of reaching the rule. This is because one problem is quickly recognizable as typical of all others. Likewise the metamorphosis of one insect readily represents that of others of the same class. The moral of a story may easily be reached from the one narrative when the theme is simple and when it recalls numerous past experiences tending in the same direction. This is the case with the Golden Touch. Children who are quickly susceptible to the force of the underlying truth must necessarily have been led already to reflect on the occasional uselessness of gold; for instance, they have found Crusoe rightly preferring a jack-knife to a whole bag-full of money. And such experiences, coupled with the narrative, indeed compared with it unconsciously, cause the moral to seem easy and capable of being reached at a single bound. However, as already shown, it is reached much more effectively if time is taken to recall other related experiences and compare them all.

But some of our great classics furnish remarkable examples of a common inability to "read between the lines." Pestalozzi's "Leonard and Gertrude" was undoubtedly regarded only as an interesting story, not as a work on education, by the great majority of its multitude of admirers during the previous century. Even to-day students need to be cautioned that it is educational in its aim before they are inclined to discover in it educational truths. One hundred years ago people wanted many of the experiences that must be put alongside those of this story in order to bring out clearly its fundamental thought. Now they have plenty of them, but easily fail to call them to mind and to associate them with the contents of the book. Hence it must be a part of the instructor's duty to call up such experiences and suggest, through them, the generalizations intended.

Pestalozzi's book furnishes an excellent example of a properly realized second step; *i.e.* there is an abundance of incidents or particulars so presented as to be very clearly seen and to appear interesting; but while there is no fault to find with it in that respect, the reader must extricate himself from this mass of details and discover the great truths that the essential parts of the story indicate before he has really read the book or gotten its worth.

In general, this step of comparison must be a considerable *abridgment* of what is necessary in a complete induction. It would be agreeable if a great number of individual valleys, trade centres, and stories teaching the same underlying thought as the Golden Touch, etc., could be studied in detail. But want of time, in school at least, forbids. Only *a few well-chosen types* can there receive such close attention, and they must represent and explain in a rough way the entire class to which they belong. It is for the home and later life to supplement this work of the school.

The various advantages of comparison.

If these individuals have been accurately and interestingly taught, the comparison that follows can awaken *much life.* It is interesting to note how a cat or a dog runs across the floor; but it is more interesting still to note how the former is fitted to do it so much more quietly than the latter. We enjoy observing just how the sheep, the cow, or the horse clips off grass from the meadow, but we enjoy still more the comparison of them to discover why one prefers long grass and another grass that is very short. Tennyson's poem of "The Brook" is very attractive in itself, but after seeing what message a little stream carries not only to one poet but to two or three, it is especially attractive to compare these messages and their various styles of expression. The old Greek heroes were wonderful men; so were our own pioneers. A class that has formed a close acquaintance with both sets of men is likely to become especially stirred in determining which had the greater difficulties to meet and which were the nobler.

Such comparisons increase not only the interest in knowledge, but its *accuracy* and *definiteness* as well. One serious defect in most instruction is that the facts taught are abandoned too soon for the sake of new ones, and in consequence they are neither thoroughly comprehended nor even retained in memory. But the moment we begin to compare animals or poems, or men, etc., they must be recalled vividly to mind; thus a careful review is instituted. But more than that: this knowledge is not reproduced in just the same way in which it was originally acquired; it is approached from some new point of view, it is seen in one or more new relations. We may be well acquainted with the life of Washington or of Lincoln; but if asked to show in what respects they were alike, or in what respects one was superior to the other, we would have hard thinking before us. Each life would need to be reviewed from a new position; points that we have been in the habit of emphasizing might receive little attention, while others that have been neglected might be brought into prominence; the result would be that new thoughts and perhaps new convictions would be reached. So a comparison of the Rhine, Hudson, and Mississippi valleys causes a careful review of each and adds new thoughts or conclusions to our stock. Most people are prone to recall facts, for instance, the causes of the Revolutionary War, in the same order in which they were first learned, if they recall them at all; in consequence they make little advance in their knowledge, it does not grow more thorough. But comparisons tend to remedy the defect by forcing them to look at a subject from one side, then from another and another, etc., the result is that their knowledge becomes more thorough, for seeing any topic from many sides or in many relations means thoroughness. Thus comparisons are an important agent in securing *interesting reviews* and *wide comprehension of a subject.*

In developing the idea of nouns the teacher gives examples of nouns such as horse, mountain, deer, tree, boy, apple, barn, etc. By examining and comparing such words as to their meaning, children will conclude that nouns must be the names of objects. But if the teacher suggests that there are other nouns such as running, playing, talking, eating, etc., and shows that these too can be used in the same way as the previous list, the children, by comparison of the two groups of ideas, will modify their statement and conclude that nouns are the names of both objects and actions.

Let the teacher now call to mind such nouns as courage, honesty, beauty, kindness, strength, fear, etc., and show how they are used in sentences. After further comparison of the three groups, the children may include names of qualities in their definition of nouns. The teacher may go farther and show that any word like *under* or *quickly* can be used as a noun, as "Under is a word of two syllables." By still further comparisons the children may be able to see that a noun is the name of anything used as an object of thought. Without such a series of comparisons it is difficult to see how the notion of nouns can be clearly formed and a correct definition obtained.

In getting a clear notion of vertebrate animals, children may notice the backbone first in quadrupeds, then in birds, later in fishes, frogs, serpents, etc. Only by successive comparisons do they arrive at a comprehensive view of the groups of animals included under the term *vertebrates*. By a similar process of comparisons does a child get the wider significance of boat, road, fruit, government, church, statesman, etc.

How comparisons lead to abstractions.

The third step was spoken of not only as a step of comparison but also of abstraction. How the latter takes place may be seen from examples. In the study of trade centres the individual characteristics of each were considered in detail. Without any further study of them we have a partially correct conception of the idea trade centre. But if we wish to make it at all accurate, we must first compare these several great cities: one, Minneapolis, is the centre for flour and lumber, another for coal, another for iron, fruits, grain, etc. Some depend mainly upon water for transportation, others upon railways, others upon both to a marked degree. Hence in order to be styled a trade centre it is unnecessary that a certain city deal largely in flour; neither must it be iron, nor coal; in fact, it makes no difference just what the articles be, so we leave that matter out of consideration. What do we hold in mind then? Those characteristics simply that are really essential and hence common to all trade centres. In order to be properly called a trade centre there must be a large quantity of goods shipped to and from a certain city; also there must be conveniences for transportation, *i.e.* plenty of railroads or waterways or other means for carrying. The attention is drawn away (abstracted) from all minor and non-essential matters and centred finally upon those that are necessary for conceiving trade centre properly. In reaching a correct definition of valley, one goes through exactly this same process of comparison and abstraction. It is practically the same in reaching the generalization in history in regard to unity. In that case while many details were studied showing the troubles that followed the Revolutionary War, only the more significant of these are now considered. They are brought together and compared — perhaps ten or twelve important facts; most of these are found to be alike in pointing toward unity as their remedy; if some of them, though important, do not hint strongly at unity, the attention is withdrawn (abstracted) from them and centred on those that do. These latter being weighty matters, and pointing all to the same conclusion, are recognized as sufficient data on which to found the conviction that our states should be united.

People are continually reaching conclusions in this way, *i.e.* through comparison and abstraction — so it is nothing strange. But the difficulty is that they do it very *carelessly* and hence make mistakes. They are prone to the same errors in this case as in the observation of the common objects about them, *i.e.* the results reached are hazy and inaccurate unless they expend conscious effort or do some real studying. It is the duty of teachers to give children training in this work and to lead them to reach important generalizations correctly in all school studies.

Fourth Step

Why clear statement of general truths is difficult.

After separating essentials from non-essentials, it remains to collect the former and to word clearly and accurately the result reached; for example, the necessary characteristics of a trade centre, the rule for addition of fractions, the law for the metamorphosis of insects, the underlying thought in the Golden Touch, or the generalization regarding unity, should receive definite statement. This is not an easy matter; the world is full of people who "know it but can't tell it." Some of the most common ideas are defined in words with the greatest difficulty. For instance, teachers quite frequently speak of good character as the purpose of education, yet they seldom dare attempt to state what the chief elements in such character are; all people are acquainted with Christ's parables of the sower, and of the wheat and the tares; yet it costs a struggle to word properly the thought in either of them. Every one, no doubt, has often been surprised at his inability to express himself on a topic with which he had supposed himself to be familiar. What is the cause of the difficulty? Beyond question in most cases it is not first of all a lack of words, but of clearness of ideas; when one knows exactly what his thought is, he can usually give expression to it; hesitation is due to vagueness. It means a decided advance in thinking to state a conclusion tersely in words; it is an advance, too, that should be regularly required from all learners, for the final utility of the three preceding steps in instruction is directly dependent on the clearness and accuracy with which generalizations are reached; their purpose is to lead to generals, and nothing is clinched until these latter are fully expressed.

Who shall frame the statement.

In whose words should the abstraction be stated, in those of the child or student, on the one hand, or in those of the book or teacher? Much is involved in the question. As a rule, the mistake is made of hastening altogether too rapidly to reach the exact wording that the book or teacher prefers; as though an exact wording given to the child would necessarily produce an exact thought in his mind. The truth is that unless the exact notion has been approached very nearly by one's own power to think and use words, the definition carefully worded for him by another accomplishes little or nothing; it does not meet a feeling of need, and fails to be apperceived or appreciated. Any statement of a definition, law, or rule should be the immediate outcome of the thinking that has gone before, otherwise it is an imposition upon the child. To be sure, children can often reproduce the book's statement and talk about it with glibness, but that proves only their ability to handle words; they are often conscious that they are only playing with phrases and wondering if the teacher will find them out; this thing is happening every day in our schools, and as a rule the attempt to hide behind words is successful. It is a game of hide-and-seek between teacher and pupil — *a masquerading with words.*

If it is true that accurately worded statements from the book or instructor do not necessarily elicit accurate thinking from the pupil, less faith should be placed in mere verbal accuracy, and the somewhat cruder statement from the child should be more willingly accepted. The latter is his own and is genuine. The exact definition very often does not appeal to him, and, in that case, instead of being forced to learn it, he should be scolded if he allows himself, parrot-like, to repeat it. The boy who said that "number tells about the how-muchness of things," had the essence of the definition; why not judge him by that and preserve his individuality? It is one of the most difficult things in the world for one to be himself in the true sense, and school instruction, instead of discouraging the real expression of self in the use of words, should count that one of its high functions. Did not the boy have an accurate idea of a bat, who defined it thus: "He's a nasty little mouse with injy-rubber wings and shoe-string tail, and bites like the devil"? Does the text-book come closer to the child's thought by describing it as a "Mammal with a wing membrane extending from the enormously elongated bones and fingers of the fore limb to the comparatively short hind limbs"? The adult's love of accuracy and graceful form of expression too often misleads him in these matters.

How reproduce forgotten statements.

The uselessness of such a memorized definition is seen from the fact that, when once forgotten, there is no way of reproducing it except by turning to the book. Now the fact is that any rule or general truth directly taught to a child will *probably* be forgotten — a discouraging fact, but certainly true; and as text-books are not to be kept at hand throughout life, how is the definition to be made available? The really useful generalization, the one that brings with it a feeling of strength, is the one that can be reproduced, after having been forgotten, through the data out of which it arose; it should be so closely associated with these and so directly an outgrowth from them that they can replace it when lost; the child himself should draw the generalization from the data in the first place, then when it is forgotten it should be reproduced by his own unaided effort. The first thing, then, in regard to the acquisition of definitions, principles, etc., is that the child reach them by his own thinking and state them as well as possible in his own words.

The ability to do this depends greatly, of course, upon his intimate acquaintance with the data themselves; the individual notions and their points of similarity must be well known to him; in other words, the first, second, and third steps must have been properly covered.

When to use the book statement.

But should he never accept the words of another? He may, and undoubtedly should, at times, but not until he has done his own thinking on the matter and feels the crudeness of his own wording. The mistake consists in offering the book's statement prematurely, before the need of it is felt. If the definition for case in grammar, or the rule for the division of fractions, is taught before the meaning itself stands out clearly in the mind, there is serious danger lest it may never be rightly comprehended; the reason is that the child, having once memorized the definition or rule, refers to it for guidance and is unwilling to turn back to speculate about its origin. It is very difficult, after having gotten the words for an abstract thought, to go back and get the thought itself, for the mind is not then in a learning attitude; having secured the semblance of knowledge, it is deceived into thinking that it has the whole thing and is impatient of delay. The only safe method, then, is to move slowly toward any definition, taxing in full the learner's ability to think and express himself, until the correct conception is reached. After that, if there is difficulty merely about a brief and accurate wording, the form of statement given by the book or teacher is entirely in place and may be learned by heart.

Occasionally at the end of the discussion it is possible to clothe the principle in a classical garb; for example, the proverb, "How much better is it to get wisdom than gold!" expresses the ruling idea in the Golden Touch; "In unity is strength," the one suggested by the historical facts presented in Chapter II. The Germans are far more accustomed to summing up their conclusions in this form than we, and the practice certainly adds grace and force to their speech. The reason for preferring a classical form of expression for a weighty thought over an ordinary form, is much the same as that for preferring a classical poem to a poor one. Hence school instruction should encourage familiarity with such proverbs or maxims as are found in Poor Richard's Almanac, the Bible, and Æsop's Fables, in poetry, etc., and should do so by selecting them to express valuable sentiments that have been taught.

Value of proverbs and poetic form.

Text-books are often in place in the fourth step. Many of them, as the ordinary small geography for beginners, brief outlines of United States history, grammars, etc., are little more than brief summaries of the main facts belonging to the studies that they represent. If these facts have been slowly reached, *i.e.* to a fair degree inductively, they should be finally reviewed and accurately summarized. Such text-books accomplish this in an excellent manner. Among some teachers it is the custom to require pupils to enter their generalizations or main outlines of facts in small blank books, with proper headings; one book

Text-books as useful summaries.

is kept for each study and, as soon as an important topic has been finished, it is written in its proper place. Thus the children practically make their own books.

When generalizations are premature.

Sometimes, especially with young children, it seems advisable not to teach the rule at all, relying upon the concrete facts — whatever their nature — to suggest it of themselves. This applies to arithmetic and to literature, as well as to other studies. Froebel emphasizes it strongly in the kindergarten. Little people who cannot appreciate the statement of an abstract rule may remember how a typical example was worked and solve another in the same way; or in literature they may recall a story together with the feeling it produced, thus receiving some benefit from it, while a full statement of the moral might prove too abstract, or, on other accounts, unwholesome. It requires much delicacy on the part of the teacher, especially when teaching morals, to distinguish what is best to be done in this regard.

In teaching the rules and analyses of arithmetic teachers sometimes demand from children a premature exactness and fulness of language. It is obvious that exact verbal statements in description of concrete objects are difficult, still more so are rules and abstractions which are much more difficult to understand and formulate. Children in the fourth or fifth school-year are often teased and worried over a long, exact, and tedious analysis of a problem in denominate numbers or fractions, or in the exact statement of a rule not yet sufficiently illuminated by examples. Generally such careful, exhaustive analyses are suited only to advanced pupils who have already acquired a clear knowledge of their subjects. In beginning any important topic in arithmetic, children should first become familiar with a process by repeated oral and written problems. If they can work these problems and give short, intelligent answers as to the reasons, it is enough. By such simple questions and answers, the teacher can tell if a child understands a problem, and more than this is often mere vexation of spirit. The recitation period is often wasted and the children vexed and confused by such long-winded analyses and statement of rules.

Over-exactness in defining the meaning of words in the reading lesson leads also to a waste of time and a wearisome routine. Such excess of verbal precision may give a little clearer insight, but it is often gained at the expense of interest and enthusiasm for the subject. It is very depressing.

Summing up: inability to state the generalization reached is due primarily to vagueness of thought; such a statement, then, is an essential part of instruction. The wording for the same should come from the child himself, being an immediate outgrowth from the data that he has at hand; this is especially important, since any rule is likely to be forgotten, and unless it can be recalled without help, the utility of the knowledge is greatly diminished. The book's statement may be memorized, but not unless it seems to voice the child's own feeling. If possible, a classical form of expression should be found for the generalization. If the precaution here advised in approaching the generalization is in place, it is apparent how ridiculous it is to place the general before children, even before the individual facts have been presented, as is often done.

CHAPTER IX

HOW SHOULD GENERAL NOTIONS BE APPLIED?

When shall the application of principles be acquired?

WHAT worth have these general truths which have been gained at such expense of labor on the part of both teachers and pupils? We may stop a moment to take account of our work done, and of the task that still lies before us. In the previous chapters we have dealt somewhat in detail with the series of steps necessary to the construction of those general notions which, properly fitted together, constitute the chief framework of a study. When the children have worked their way to a clear grasp of these general notions, by a self-active, inductive process of thinking, have they not reached the end sought by instruction? If so, the goal set up is a clear view of important principles. To those who look upon the school as a place of preparation in contrast with later life as a field of application, this is the goal of school studies. But this leaves unsolved the child's most difficult problem; namely, the acquisition of *skill in the ready use of principles.* It has been said over and over again by the best teachers and writers on education that principles and rules are never safely mastered till they have settled into the usual practice and conduct of a child. "For from repeated cautions and rules, never so often inculcated, you are not to expect anything either in this or any other case further than practice has established them into habits." (Locke, par. 10, "Thoughts on Education.") If children are to know how to apply important principles in later life, *when shall they acquire the extremely difficult art of application?* There may be a whole series of abortive efforts in education due to this disposition to call a halt in the mental movement before the final result in the form of useful application is reached.

Errors on the road to application.

The first of these errors was seen above in the *verbal mastery* of rules and principles without clear insight. No matter how fluently and trippingly a child in the schoolroom may run off such formulæ, the whole process of learning may be empty and farcical. At the other extreme, the most complete *theoretical mastery* of principles will not give proficiency in their practical use. One may master the grammar of the German language and still cut a most blundering figure in German conversation. Between the extremes of rote-learning and of clear insight into principles there may be an entire series of miscarriages. But even beyond the step of clear insight there may be the greatest miscarriage of all in the failure to turn clearly recognized rules into use. The end of instruction has not been reached until skill in the actual application has been developed.

We deceive ourselves again and again by stopping at halfway stations on the highway of learning. We are not simply sight-seers, to be satisfied with fine views, not caring to reach any destined point.

The breadth and variety of applications.

One who has worked his way up to the clear grasp of some important principle stands at a high point and gets a broad survey. A survey of what? Of the road he has already travelled, and in part also of that which he is still to traverse. That is, he has a double task to perform: first, to look backward and see the extent to which the principle operates in what he already knows; and, second, to look forward and apply it to the new problems which he is about to meet. Both these things are difficult. But they are difficulties which lie of necessity in the path of knowledge. As when travellers ascend some broad mountain range, till they reach at last the summit of the highest ridge, from which they look back over the slopes behind and forward on their journey through mountains and plains, so the student, as he rises to the grasp of some large principle, looks back over the steps already traversed and forward to those which follow. The discovery of a great principle is no doubt a long forward step, but it may take all the rest of one's life to find out the breadth and variety of its applications. The first grasp of such a principle, be it never so clear, is only a foretaste of the richer fruitage it will still bear. When Columbus first landed on the shores of the Bahamas, he had indeed solved a great problem, and had gone far toward establishing his general theory; but there was a bigger problem to be solved, both as to the continents of America and as to the extent of the world whole. Since Darwin first expounded the law of evolution, it has been applied by scientists in scores of directions only vaguely contemplated by Darwin himself. Macaulay, on the basis of the principles of common law in England, worked out a serviceable plan for the administration of justice in the courts of India. How the world is astonished from time to time by new applications of the power of electricity which operates under certain laws! Every new principle discovered becomes an instrument of investigation, a lever for prying open new secrets. General notions, the more we grow up to them, become more and more the interpreters of our problems, the keys which, like the open sesame, unlock and swing open many long-closed doors. Nature everywhere locks the door and bars out the intruder. But whoever carries a bundle of bright keys in the form of principles and laws, and is constantly turning and testing them in use, will rapidly gain the freedom of the realm. This is, indeed, the goal toward which instruction should move, and never lag till the end is reached; namely, such a working mastery of general truths as shows itself in ready instinctive tact in common use. The great fact here to be kept in mind is, then, that the value of general truths lies in the freedom and versatility with which we can turn them into use.

We see now a great defect in much of our knowledge, and why it is so halting and unserviceable when called into sudden action under the emergencies of life. The old adage teaches that knowledge is power.

The difficulty of relating theory to practice.

But the power of the school-trained man so often suffers a partial or complete paralysis in times of need that this old proverb seems only half true, or in cases not true at all. Its truth depends upon the meaning which is read into the word *knowledge*. Undigested, unorganized knowledge is not power. Knowledge which has never been tested in use, never worked over into habit, is not power. Knowledge, stored away in the half-forgotten recesses of the mind and even in the time of learning not clearly understood, is not power.

The old question of the *relation between theory and practice* is here at issue. The prevailing question in school is, What do you know? But life insistently demands, What can you do? and since school prepares for life it should meet this demand. In the case of many reputedly well-educated people, there is a wide breach between their knowledge and their power to do. It is the duty of the school to make the ability to do a part of the knowing.

The boy who wishes to be a sailor has acquired some knowledge of ships and of seafaring life. He has heard stories and read books of travel and adventure in foreign lands. In fancy he dreams of delightful voyages, and is only disenchanted by the rough usage of real sailor life. But this inuring to hardship and rough usage is a necessary preparation for good seamanship.

The errand boy in the bank office forecasts his easy success as a great banker, but tires under the long routine and industry of working his way to a complete knowledge of the business. The young student of agriculture has vivid theories of the revolution needed in farming; but the careful and constant labor required for keeping down expenses and losses, while securing profits, leads to wisdom and thrift.

But failure and miscarriages are not confined to young people. Older persons constantly blunder in measuring the distance and difficulty between an idea and its realization. In consequence life is strewn with wrecks. The unrealized schemes and half-executed projects of business men everywhere cumber the ground. If the schools, therefore, can induce any habits which bring thought and action, knowing and doing, into vital union, they will perform a great service to society.

There are certain situations in life where such a close relation between theory and practice can be witnessed. The boy brought up by a prudent father to the hard and varied work of the farm, daily welds his thought and experience into union. His practice keeps pace with his knowledge. The young recruits of Prussia are inured, even in time of peace, to the hardships of war. The best preparation of a soldier is to experience the drills, marches, hardships, and manœuvres of army life. This kind of training makes the soldier a veteran before he has seen a battle. Our medical schools, by means of laboratories, dissections, and clinical operations, come as near as possible to making expert physicians of their students before allowing them to practice. In trade and polytechnic schools, students are brought, by dealing with the actual materials and processes of their work, to skill and mastery of the mechanic arts. In all these cases the school is formed into the closest possible resemblance to life. In law schools, by moot courts; in theological schools, by drill in preaching; in normal schools, by practice departments, there is a close approximation to the actual difficulties of later professional work.

Should the common school relate knowledge to practice.

But does this law of close and inseparable companionship between knowledge and its use prevail also in common school studies? It is easy to see that professional schools of all sorts must lay great stress upon the use of knowledge, because each of them aims directly at practical efficiency in a single calling. But the common schools are not designed to fit children directly for particular callings. The knowledge they give fits equally for all callings.

Now it will be acknowledged that the general culture acquired in the common schools is just as essential to complete living as is the particular knowledge gained in law, or dentistry, or engineering. But has it the same close relationship to practice? Why not? Mere knowledge is not what we are after in common schools any more than in a chemical laboratory, but rather character as expressed in conduct. Character is the union of theory with practice; it is the incorporation of knowledge into habit. If character is being formed in school years, just to that extent knowledge of some sort is being converted into use, changed into habit.

But the school is inclined to lose sight of this measure of its efficiency, to shift the responsibility for character, and to set up an artificial standard of excellence. The present prevailing school standard is an intellectual grasp of knowledge, tested by examinations; unfortunately this test does not reach far enough. Oftentimes it falls far short of the final test of power to use. When a child in a history or reading lesson appreciates an example showing the bad effects of sudden and uncontrolled anger, he has caught a clear view of an important truth in life; but no one will claim that the lesson is really learned till he is prepared to curb his own anger under provoking circumstances. During the recitation, at recess, and upon the playground the teacher has better and more important opportunities for testing the best ideas in conduct than the written examination can furnish.

We all admit that the application of truth must come sooner or later, but when shall this be? Is it safe to postpone the use of knowledge to later years? Doubtless we shall have much need for it later on. But shall we be able to bring it into use in future years unless we habituate ourselves to its use during the period of acquisition? Children are in the full tide of life. They show many-sided activity. Conduct is not a future contingency, but a present fact. They have all sorts of duties and responsibilities. There will never be a time when the child will have more varied uses for his knowledge than now. But the habit of separating knowledge from use is in itself pernicious, and when formed in youth is a positive obstruction to success in mature life. Is it any less important that a child should put in practice day by day the merits and virtues of his early training than that a plumber, during his apprenticeship, should learn the technique of his work in iron. Is it any more necessary that a theological student should learn to make and deliver sermons at the seminary than that a boy in school should learn to be self-reliant and honest in board work?

Many of the most important lessons of life must be learned and converted into habit long before professional studies are begun. Before the boy decides to be a merchant or a dentist, he must decide whether he will be an honest man or a rogue, a law-abiding citizen or a disturber, narrow and bigoted, or charitable and liberal. Until these things are settled, and settled right, it is an impertinence to talk of a profession.

The danger of neglecting the application of knowledge.

The incomplete and theoretical character of much school knowledge is brought to light by the perfunctory and half-hearted action of children while engaged in school work. Good study, like good eating, is marked by relish and appetite. But where zest is lacking, work is spiritless and without healthy tone. When the strong life impulses pour themselves through the school studies the latter then become a part of the child's deeper character-forming experience; that is, an organic part of life, not dead matter wedged in between the living tissues. Children should be occupied with studies which spring out of and return into their interests, which call out the full measure of their volitional, emotional, and active powers as well as the intellectual, all of which together give complete expression to their life impulses. A theoretical, bookish knowledge, to which our school work is sometimes limited, not only gives a torpid intellectual growth, but it dwarfs the social activities. It is fractional and does not compass a child's whole life, nor reach far enough into his own deeply felt experience and need. It does not fill up the measure of a child's spontaneous action. And this many-sided spontaneous activity of children is their mode of applying knowledge to life.

If we neglect some of the normal phases of child-activity, as, for instance, the volitional and motor energies used in applying knowledge, why should we expect later life to make good the deficiency? How can a schooling which is not full enough to satisfy a child's present limited needs prepare for the wider, more complex life that follows school? Adult life is an expansion of child life. If the boy is a theorist, seeking no useful outlet for knowledge, the man will probably show the same traits in an accentuated degree. If the child life is incomplete and fractional, adult life will show the same defects. The only kind of knowledge that will stand the test of later years is that which has linked itself with conduct and has thus appeared in that final form by which its value is tested and its assimilation into life rendered complete. To make use of knowledge as it accumulates day by day is to rescue it from theoretical isolation, is to yoke it to service under the coercion of daily needs.

It is a praiseworthy economy of mental labor to sift out from studies that knowledge which is widely and constantly serviceable, and to mass the effort upon this as indispensable. For its supreme worth or worthlessness comes out only in use.

How economy of effort is gained by the application of principles.

It is a mistake to collect a large body of principles and facts which have no present, and only a possible future use — waste material, which is an annoyance in the learning and a burden to the memory. The simple principles of the English language come hourly into practice, and this is a test of their value as being worth learning. When this test is constantly made, education is stripped of waste and verbiage. We need to concentrate our efforts along a few important channels. Education, like the waters in the delta of the Mississippi, loses depth and carrying power as it spreads out into divergent channels. Captain Eads's plan of the jetties of the Mississippi River was to collect as much water as possible into a single narrow channel, and to scour out a serviceable passage across the bar. Likewise, the accumulation of thinking power upon those few principles in each study which have central importance and perpetual application is the true economy of mental effort. Studies which fall short of this useful goal cultivate theorizing and even do-nothing habits.

Both the faults as well as the merits in knowledge are brought out by use. In the effort to use acquired knowledge the partial or erroneous views come distinctly to light. Just as a piece of machinery when put into operation reveals at once any friction or imperfection of construction, so knowledge newly acquired is thoroughly tested in its application. In learning a modern language, like French, the daily and hourly effort to use the new rules brings out a multitude of blunders, but at the same time begets constant improvement and mastery of the language. If newly gathered knowledge is not put to service, these difficulties do not appear, and we are led to a false security, a self-satisfied but empty presumption of knowledge.

Is it utilitarian to lay stress on application?

On account of this varied stress upon the use of knowledge, can we be charged justly with lowering the standard of education, with forgetting higher things for the sake of direct utility? There is a lower form of utility which reduces everything to the standard of dollars and cents. This, of course, is to be rejected. The most important uses of knowledge and power cannot be estimated in money, as, for example, the services of a parent or teacher or friend, and it is these higher uses of knowledge which it is the preëminent purpose of the school to cultivate. The great principle of utility is right and has universal value. The best thing that can be said of science or philosophy or religion is that it serves human needs. The doctrine of service is too vital and too deeply felt in our Christian civilization to need any defence. By their fruits ye shall know them. We have, in the service rendered, an infallible test of the value of the man. Knowledge is valuable just to the extent to which it can be transmuted into some form of useful service.

How application enlarges the scope of principles.

The application of general truths falls under the head of *deduction*. The first four steps are inductive, leading up from particulars to generals; the last step is deductive. Does the deductive process expand and amplify our experience, or does it simply give quickness and tact in the use of what we have learned? It is evident that the inductive process of deriving the general truth can touch only a few cases, *i.e.* is narrow in its range. In treating Minneapolis as a trade centre and as a type of cities on the upper Mississippi, a general truth about cities as centres of trade for collecting, manufacturing, and distributing products was evolved. But in applying this truth (deductive) to the lake cities we find the situation similar yet different. Albany and Troy, Bangor and Augusta, St. John and Montreal, furnish still further examples of trade centres in lumber, but under quite changed circumstances. Pittsburg and Allegheny are fine illustrations of the notion trade centre in other products, yet still more divergent from Minneapolis than those mentioned before. Should we compare Minneapolis with Liverpool, Glasgow, Hamburg, and Naples, we should find the same notion operative under still more widely differing surroundings and conditions. In other words, the continued application of the idea *trade centre* to new cities not only enlarges the number of objects falling within the scope of the idea, but multiplies the variety of objects coming under its sway.

In the study of the milkweed butterfly the first inductive treatment of this topic is confined mainly to this one species, but in applying the general idea of *metamorphosis* to other butterflies we find great variety in size, color, food-plants, habitat, and organs.

Extending this application to moths, another large and curious field of insect life is brought under tribute. Finally, in referring the idea of metamorphosis to flies and other insects, we are astonished at the simplicity of the law that pervades so great a variety of insect life. In the application of such a general principle or law we are constantly introduced to new and varied fields of knowledge, whose meaning is more quickly interpreted and more intensely felt because of its identification with what we have already learned.

How versatility is needed in applying principles.

Moreover, this constant variation and readjustment of the principle to new objects and conditions necessitates a genuine *thoughtfulness* at every step. It is not a mechanical routine which simply repeats the same action time and again. *To apply general notions requires a rational self-activity.* We never meet exactly the same situation a second time. The student in this case is like the pilot of a Mississippi steamboat. He must know not only the large bends and currents of the river, but also the shifting of sand-bars, the new obstructions and snags, the changes that follow a freshet in cut-offs, and shiftings of the channel; in other words, he must be alive to constant alterations and emergencies. Or as with the military strategist, in directing the movements of an army, every day brings a new situation, makes necessary a recombination of forces. Arithmetic illustrates the point perfectly. Every new problem is a new and somewhat modified application of the principle, and as the boy advances to more difficult miscellaneous problems, he meets more complex and intricate embodiments of his principle. This fits him to meet the usual conditions and necessities of life. Every day brings a new situation requiring thoughtfulness in applying knowledge to new conditions.

In bringing up children in the same family we have a striking illustration of the necessity of *modifying our application of principles* to suit different individualities. A writer like Spencer can give a lucid statement of the universal truths upon which the management and proper training of children should be based. A father tries them upon one child in the family and they seem to work admirably. He begins upon the next child in the same way, but the method seems totally at fault. Is it really a weakness in the principles or in the clumsy method of applying them? He forgets to modify and adapt them to the new character. This adaptation of a principle to changed or more complex conditions is what makes the application of knowledge so difficult. It demands constant thoughtfulness and prudence. There are, indeed, kinds of business, fragments of trades in factories and shops which call for an invariable and exact routine; for instance, the carpenter who makes one invariable design, the operator who simply nails heels to shoes, or the switchman who pulls the levers of an interlocking switch. But these people do not develop strength and versatility of character; in fact, they are in danger of becoming fixed in a narrow routine which unfits them for doing anything else when thrown out of employment.

Why exact reviews are not the best form of application.

From this standpoint of flexibility in the use of knowledge (as already discussed also in Chapter VI) we are able to estimate the value of a *review system* which simply repeats and drills upon the *exact form of thought* and expression which was first learned. There is, indeed, no objection to the exact formulation of a general truth nor to memorizing it; but flexibility in its application is more important than verbal accuracy in its statement.

The stated reviews which drill and redrill upon a form of words rather than upon a quick interpretation of a principle under changes and disguises is a cramping routine. It is much more important that a child shall get a quick, firm grasp of a general truth, in spite of its Proteus-like changes of form, than that he should be held to an invariable formula in its statement. Excessive routine drills and repetitions give thought a certain *cast-iron inflexibility*. This fixedness makes knowledge unmalleable. It is like cold iron in the hands of a blacksmith. Our generalized thought needs to be made wonderfully pliant and flexible so as to shape itself to a thousand diversities of form. Some minds have a photographic accuracy in regard to principles and details, but mental photographing is not the higher form of thinking. Thought when rationalized in principles must be plastic and versatile.

The best form of review, therefore, is that which springs out of comparisons, which finds in the new lessons amplifications of old principles, which makes every lesson a review of old knowledge in the light of new experience. Incidental reviews and comparisons, by which every new topic is incorporated into the body of our previous experiences, are the rational form of study. It is constantly making over, modifying, and expanding the old thought material. The stated periodical review presupposes a *static condition* in knowledge; such knowledge, when finally salted down, partakes of the nature of a petrifaction and lacks that fluidity and pervasiveness which make it penetrate and permeate every nook and avenue of experience.

Can pliancy and strength go together?

But principles lose none of their strength and stability by being rendered pliant and flexible. Their constant reappearance and identification among all the forms of experience show that they are constantly elaborated out of past thought and action, and stand ready to measure up and test new data. Each person grows out of his own past into the future. The field for the wider application of principles is our own present and new-entering experience, not some *terra incognita* to be revealed in adult life. Our own daily life and surroundings furnish the perpetual test of our growing maxims. The discovery of such pervading principles strengthens the personality and gives a centre and foundation for the character to rest upon, from which it is not easily moved. It is when we fail to find an anchorage in such fixed yet flexible principles that we shift from day to day. This pliancy of knowledge can be secured largely in the natural order of studies.

Mastery of principles as related to great variety of application.

Our examination of the school studies has given striking proofs of the necessity for the perpetual use of knowledge, following close upon the heels of acquisition. It is indeed a serious question whether it is *real* knowledge until it has been apprenticed to use in a variety of ways. When one or two arithmetical problems have been worked out to illustrate and fix a rule, it is not claimed that the principle is fully understood. To insure more thoroughness in its mastery, problems of increasing difficulty are worked out and explained. Further on, miscellaneous problems, involving this rule in conjunction with others, are solved. All along the quickness and versatility of the children are exercised upon mental problems involving the same rules. Even after all these devices and tests for insuring a clear recognition of the rule, under the various disguises in which it masquerades, teachers are often discouraged by the pupil's apparent blindness to the principle. The whole round of inductions and applications, if necessary, must be repeated. Among various difficulties, the hardest thing in the whole course of instruction is to learn to use knowledge *rationally*. Memory work is trivial compared with this kind of thinking power. This fatal weakness shows itself among college men, scholars, and among all classes of even so-called educated people.

The same difficulty is met in trying to get the mastery of good English. Language lessons emphasize certain correct forms and usages, *e.g.* a drill upon the rule for irregular verbs or pronouns. The children see the old error, understand the principle, and apply it to a few sentences. But wrong language habits are not cured and remodelled by such brief exercises. In geography and science lessons, in reading and history, the children should run their language into these new and better moulds. Else why have them? Or, if you like, let them disregard in history and geography the correct usage learned in language. The children are encouraged by our indifference and neglect to violate the principles which we have just been so anxious to inculcate (in another study). What is our teaching, then, other than a succession of contradictions? What greater inconsistency can we devise than to teach earnestly the value of a correct principle in one recitation, and then encourage children to ignore it in the practice of the next? What is worth learning in one lesson is worth practising in all others where it naturally reappears In reading we insist on a certain excellence and weed out the faults. It is equally important to require an expressive reading when reading is incident to grammar, arithmetic, or history. This will make good reading natural and habitual. Likewise, if a round, vertical script is required in writing lessons, let the same excellent penmanship appear in composition exercises, in arithmetic, in board work, briefly in all necessary written work.

Each study a field of application for other studies.

In view of the principle of consistency just stated, we conclude that any one study clearly emphasizes certain ideas and principles peculiar to that subject, till they stand out, in theory at least, with clearness. The other studies furnish just the necessary additional opportunity for *applying* these ideas and principles till they are converted into habit and become established in all regular usage. In pointing out this close connection we see how indispensable the branches of school instruction are to one another. No study can stand upon its own feet. Complete efficiency requires that all studies stand close together in mutual support. Complete isolation of different studies is extremely impractical because it destroys this opportunity for utilizing knowledge. If knowledge is not complete till it is worked over into regular practice, it is just as important to apply knowledge gained in one study to other studies as to get the theoretical mastery of each study within its own realm.

This unity and interdependence of different studies and experiences is still more vital in the important

Moral training weak on the side of application.

realm of *moral education.* Moral instruction, by itself, can effect little if anything. The moral ideas scattered through reading, history, and literature, no matter how beautiful and impressive they may be, need to reappear in all the studies, and especially in all the conduct incidental to the discipline and social order of the school. Perhaps the chief reason for the prevailing scepticism in regard to the value of moral instruction in schools is that it is too theoretical, too much divorced from practice. Efficient morality always finds an expression in conduct, in the application of moral principles to behavior. In this respect there is no study or phase of school life that does not need to be, in its entire inception and progress, moral.

So important is the practice of the virtues as compared with their theoretical treatment that many people have gone to the extreme of putting the whole emphasis upon the practice, and of giving no place for instructive examples and illustrations of moral ideas. As if conduct, the highest and most difficult of all arts, had no theoretical basis and no rational approach, through instruction, to its difficulties and opportunities. The subject-matter of some of the school studies is prolific in moral and social ideas and examples, while all the studies, plays, recesses, and social experience of the school furnish a broad field of conduct and realization. Instruction and theory must culminate in use or fall far short of any practical result.

This entire discussion confirms us in the judgment that the application of general truths to a great variety of uses is the fifth essential step in all good instruction. The school in all departments of instruction should never limit itself to the theoretical treatment of studies, but the movement toward use and application should be strong and should constantly pervade all school effort. Anything short of this is not real education but is fractional or even abortive.

The application of knowledge by apperception and correlation.

There are two important principles which not only demand, but constantly work out this translation of knowledge into power, into practical service; namely, *correlation* and *apperception*. The examples just given of the close interdependence of studies furnish one of the strongest arguments in favor of correlation. *Apperception* in every lesson emphasizes the turning of our accumulated store of knowledge into service. The very definition of apperception shows that new information can only be acquired and assimilated through the *interpretive use* of old ideas. Apperception throws a child back constantly upon his own resources; upon the thoughtful use of acquired knowledge and experience. It makes no difference from what study or source the old knowledge springs. The geography lesson may draw its interpretive materials from reading, history, science, or the playground. The whole horizon of experience should be kept in sight of every study.

This is the true thoughtfulness and self-activity. It is simply a restatement in pedagogical terms of the old parable of the talents, that what we have inherited or accumulated is for use and not for hoarding.

How child activity demands application.

The school then, like life itself, is as much a place for *applying* as for *accumulating* knowledge. The traditional idea of storing up knowledge against the evil day is narrowing and cramping in its influence upon child activity. The fact that children have quick memories and large receptive powers is not a safe ground for exclusive memory exercises. For children show such an overplus of activity in expressing and using their fund of knowledge that the argument in favor of application is at least equally strong. The avenues through which knowledge can be turned into use in childhood, and in school life itself, are so numerous as to constitute a full share of legitimate child life.

There is, therefore, a broad foundation upon which to base this demand for the full and complete expression of child life. Children are little men and women, and their impulses press on *to a complete circuit of activity*; perceiving, knowing, feeling, willing, or doing. In this series, the productive and constructive use of knowledge is as conspicuous as any other phase of effort. The doing always rounds out and perfects the knowing. Without pressing on to this final test of knowledge in use, the child's activity is prematurely arrested. On the other hand, education, by its excessively theoretical tendency, may produce a whole race of inefficient and impractical men and women.

In all the essentials of character and power such people are apt to be weak and worthless. They deceive themselves and others with the semblance of learning and education, but they are inexpert and bungling in important affairs. The *storage* theory of knowledge needs to be reënforced by the *present use* theory, which organizes and unifies the incoming experience and gives it flexibility and aptness for still more important future service.

To teach children how to apply their knowledge requires much *painstaking care and patience* in the teacher. It is in their first efforts to apply knowledge that children are slow and bungling, and tax the long-suffering patience of teachers. Many a mother has made the fatal blunder of not letting her girls wash dishes or sew or make bread (even when they wanted to) because the girls were so awkward and blundering and unsuccessful in their first efforts. The mother prefers to do things herself rather than let the girls botch their work and waste materials. But the only road to success lies through this period of awkward and sometimes painful effort.

Amount of time now given to application.

Even with our present methods of teaching, the amount of time spent in applying principles constitutes a large proportion of the available school time.

In arithmetic three-fourths of all the time is spent in applying rules to problems. In reading a still larger proportion is spent in the effort to put in practice the few simple principles of oral expression.

The one chief purpose of language lessons is to cultivate the proper use of the correct forms of oral and written language. In grammar the parsing and interpretation of the rules of etymology and syntax, that is, application, take up a large share of the study. In writing and spelling we may say that the purpose for which they are studied is the necessity of their constant use in other branches. Drawing is now felt to be largely tributary (in the common school grades) to the other studies because of the service it can render in more clearly defining their objects and conceptions. In history and geography it would be more difficult to show the immediate uses of the knowledge acquired. This, however, is largely due to our faulty methods of memorizing facts, instead of studying out these facts in their important relations and uses. A general view of our school studies, as now taught, will show how fundamental is the principle of the application of knowledge.

But in order to secure the proper kind of thinking, self-activity, and organization of knowledge, *still more time will have to be given to application.* We are not wasting time when we stop and wait for children to think out the relations and use of what they are learning. We may, indeed, seem to move slowly, but we are moving as fast as their thinking power will permit. It takes time for children to think out and adapt these principles to new and changed conditions. To neglect the cultivation of such thinking power as this for the sake of a little verbal fluency and memory drill, is short-sightedness and even folly.

Power to apply knowledge as a source of energy.

In saying that the effort to apply knowledge is laborious, and that school study is thus rendered more rigorous and severe, we may seem to be laying an uncalled-for burden upon school children. But children will find in such applied study rich compensation for their effort. The truest satisfaction of all study comes from the conscious power to make ready use of it. Knowledge is always something of a burden and a discouragement till it has found an outlet in some definite form of utility. There is no point where we can stop in this movement toward knowledge and feel sure of its value, until the goal of useful application is reached. The real irksomeness and discouragement of study do not spring from proper efforts at application, but from the dull, often meaningless, memory drills, which do not even reach forward to clear knowledge, to say nothing of power to apply. Knowledge, which thus ends in a blind alley, and finds no entrance into the thoroughfares of life, is a deadening influence in our schools. It produces stagnation in voluntary effort, while successful application of newly gathered knowledge leads out into the clear sunlight of conscious power.

Children who have learned to apply one lesson thoroughly are ready and eager to grapple with new problems. There is no better test of successful progress in studies than this power to render practical account of our possessions, and there is no better guarantee for future energetic effort.

One conclusion that springs from this entire discussion is that *the proper use of knowledge has to be learned.* It does not come by accident or inadvertence, but is the result of definite purpose and rigorous effort. Even if later life with its severer tests were not to follow, the school would need the tonic of this kind of effort to adapt and use knowledge in order to bring school work to proper unity and completeness.

We may now glance back at the *lesson unit*, in the treatment of which *application is the final step.* In working up to a general truth or concept through particulars, we have followed the inductive movement through the steps of preparation, presentation, comparison, and generalization. A single central thought which lies at the root of the lesson unity has dominated the entire movement. In the application we are still operating with this central truth, turning it about, testing it on new data, and detecting the various forms in which it clothes itself. The length of time, that is, the number of recitations required in working out this general truth through all the five steps, depends upon the simplicity or complexity of the central truth itself, and the amount of data required to develop and apply it.

CHAPTER X

THE VALUE OF TYPES

Relation of the lesson unity to the general truth.

THE magnet which lies at the centre of every weighty lesson is the *general truth* which is to be worked out and applied. The entire foregoing discussion of the succession of steps in the handling of a *lesson unity* unfolds the growth of a general truth in the mind. A proper lesson unity is a topic which has such an embryo truth in it, and the lesson process follows the growth of the truth in the child's mind up to maturity and fruitage. This elaboration of a general truth involves the complete circuit of mental action from the observation and comparison of particulars up to the clear grasp of the general notion, and back again to a broad and ready interpretation in its light of the varying objects and situations in life.

All the illustrative lesson unities in Chapters II and X are examples of the working out and application of such general truths. In irrigation is explained the process by which water from rivers and lakes is brought upon arid lands and utilized. This process, with modifications, is the same for hundreds of irrigating ditches, and presents one of those general truths of agriculture which deserves our attention. In the battle of King's Mountain the independent spirit and energy of the common people are exhibited in a striking and successful raid against the English troops. By a close comparison we find this same spirit at Bennington. When we come to expand this truth, and interpret other events in its light, as, for example, Bunker Hill and The Cowpens, we find this spirit breaking out on many important occasions. In other words, a general truth is strongly suggested by the careful study and comparison of two battles, and this is the chief reason for their elaborate presentation. The study of Minneapolis and the other cities of the Northwest was to set forth in clear and unmistakable outlines the general notion of a *trade centre* in lumber and flour. The rule for the addition of fractions, the metamorphosis of the milkweed butterfly, the Golden Touch, and national unity illustrate the same centering of a whole lesson unity in a single thought or general notion. How to get at these general truths is undoubtedly the one problem of recitation method.

The relation of the type to the general truth.

How far does the study of *types* render us direct aid in the struggle to master general truths? The very word *type* seems to bridge the chasm between the particular and the general. The type itself is always an object, a particular thing, action, or process; but in so far as it is a type, it is a representative object, it stands for a whole class, the features of a general truth shine out more distinctly through it than through other objects of the same class. We say that Peter Cartwright was a type of the backwoods itinerant preachers. Garrison was a type of the uncompromising abolitionists, Asa Gray, of scientific students, Spurgeon, of Baptist preachers of England; but in the typical or representative man the general truth seems to stand out enlarged, magnified, more forcible and tangible than in the average man, in whom it seems to be obscured by dulness or personal defects.

Is the type a short-cut in induction?

A type, therefore, has all the interest and concrete intensity of a particular or personal and conspicuous object, while at the same instant it displays to the thoughtful person the clear outline of a general truth. This does not appear to the child at first as a general truth, but a little later, by comparison, it is brought out clearly. If general truths are what we aim at, and if the type points the way to the general truth with greater precision and strength, then why not select the best typical objects as the centres of our lesson unities? But in setting up *types* as the pivotal points in recitation method we are met at the threshold with vigorous objections. Are we trying to discover or invent a short-cut from the particular to the general notion? Does not induction require that we study the individuals one by one before comparing and deriving the general notion? In saying that a type is both particular and general, are we not throwing into confusion our whole inductive plan? How can a child see a general notion in a single object before others have been brought to his notice? Of what value is the step of *comparison* if the type idea in a single object is so significant?

The answer to these questions and objections may reveal to us more definitely than any other means the practical and modified working of the inductive process in dealing with the new forms of truth as they arise in children's minds.

It must be confessed that the study of a type is a *short-cut* toward a general truth, but it is an abbreviation of the process which the trained scientific, as well as the untutored, mind inevitably takes.

A child first makes the acquaintance of its own *father* through a multitude of successive daily experiences, revealing many sides of his character. A little later, in meeting other fathers in the neighborhood, he is inclined to project this familiar notion of his own father into these other fatherly characters. Certain it is that he does not make a second, third, and fourth elaborate study of neighboring fathers, and then sit down and patiently compare them in order to discover the type idea. The dominant notion in the child's mind is the idea of his own father, and this is modified from time to time by the incidental experiences met with in the neighborhood. Even the strict and exact scientist in collecting his data for later ultimate comparison and conclusion, projects his previous experience into every new experiment, avoiding errors and accelerating his observations by a constant reference to previous knowledge. The ornithologist, who studies the stomachs of birds to determine the character of their food, moves up gradually to his final conclusion, comparing each new specimen, in part at least, with the average of his previous data.

Strict systematic induction, *i.e.* a careful observation of one specimen or example after another and a later comparison, is almost never followed in the young student, and is only realized by the mature scientist. Only one or a very few objects are carefully observed, and a quick observation and comparison of a much wider field of similar objects is sufficient to set forth the general truth. Indeed, we cannot afford the time for a full and elaborate study of many specimens of a class. If we can find the time for a careful scrutiny of one or two oak trees, we can afford to take a swift or cursory glance at other oaks. For the average student this is all that can be expected or desired.

How comparison reveals the type.

And yet a clear general notion cannot be reached without *comparison*. A number of similar objects must be brought together, and their differences and likenesses distinctly marked. It is only in this way that the generic properties can stand out as the basis of a general notion. It would be a waste of time to give a detailed description of more than one city in the Northwest like Minneapolis, or of more than one irrigating ditch in the West. A very much briefer account of other lumbering cities and other irrigating ditches, with the distinguishing characteristics and differences, serves all the purposes of comparison.

The number and kind of types needed

We cannot fail to observe that some objects are very much better types of the class to which they belong than others. Minneapolis is a very striking type of the lumber and flour city. The milkweed butterfly is a conspicuous common species of butterflies. Daniel Boone is almost a perfect type of the backwoodsman and Indian fighter. The Hudson is a remarkably clear and majestic type of our navigable rivers. Daniel Webster is our preëminent orator, much more distinctly so than Calhoun or John Quincy Adams or Sumner. Mount Shasta is a remarkable type of extinct volcanoes. Study it in the elaborate monograph by J. S. Diller, and make the brief comparisons he suggests with other volcanoes, and you have an excellent treatise on volcanoes, and get a fine appreciation of the general truths which they all illustrate. Study the life of Samuel Adams in Hosmer's biography. You become intensely interested in a man of peculiar force of character. The scenes in Boston in which he figured as a controlling spirit are among the most picturesque and important events of the eighteenth century. Looked at from the standpoint of a personal history, it is as thrilling and instructive as one of the great novels. But compare

Samuel Adams with three or four other prominent characters about Boston, — Governor Hutchinson, James Otis, John Adams, and John Hancock, — and you will get at the very nucleus of New England history during that most stirring period. After such a comparison you will see that Samuel Adams stands forth as the representative Puritan leader of New England, the acknowledged type and embodiment of the spirit which animated thousands of lesser Puritans.

For all the practical purposes of life we must content ourselves mainly with the study of such types. We have neither the time nor the strength to study all the Adamses in equal detail, to say nothing of all the Smiths and Browns. We simply cannot enter into the details of all the important statesmen, volcanoes, rivers, cities, or butterflies. Good teaching in most studies depends first of all upon a careful selection of *a few best types*. Instead, therefore, of spreading our attention over a great multitude of facts, we pick out a few important centres. Around these we gather a large body of facts; we trace out the causal relations of the central type object to its environment, and finally we discover by comparing it with other similar things that it is the representative of a law which repeats itself in scores or thousands of other cases. It stands at the head of an army of facts all of which obey the same command.

But nearly all objects and phenomena in nature are essentially typical in their deeper-lying characteristics. How, then, may we select among objects all of which are types? Even if all objects were equally typical of the classes to which they belong, it would be a necessary economy of effort to pick out and make a careful study of a few, with later comparisons, in order to get a quick and sure mastery of the many. But objects differ greatly, as noted above, in their typical or representative power. The value of any type as the principal basis of a lesson unity (be it an event, a person, or a natural object) lies in the *strength and reach of its representative qualities*. The sunflower is a much more striking type of compound flower than is the wild aster or even the dandelion. The Colorado River is the most conspicuous type of cañon-making streams. For mature minds, at least, Shakespeare is one of the few best poets for study, because of the preëminence of the cardinal poetic qualities in him. And among the masterpieces of any great author some are more typical than others. Among the Waverley novels, for instance, "Ivanhoe" gives the most vivid and realistic pictures of feudalism which Scott delights so much in portraying. In selecting the complete masterpieces of literature for regular use in reading classes, we cannot be satisfied with anything less than the best typical poems, essays, and speeches of our American and English masters.

Some trees in the forest strike their roots deeper into the soil, spread their branches wider, and tower higher than their fellows. This is far more the case in human life and history. Some men project their influence throughout whole nations and stand forth noticeably as representative leaders of millions of their fellow-citizens. Emerson in his "Representative Men" has shown clearly that their power lay in their ability to absorb into their own lives the great typical ideas and impulses that were abroad among their fellow-men. This simplifies history. It is only in this way that we feeble mortals can grasp the meaning of large, complex, political, and social phenomena. We see the essential features of a widespread movement incorporated into the striking personal traits of a Gladstone or Luther, and what was before complex and obscure flashes forth in a simplicity which the commonest intelligence can grasp. Some men have not only towered above their contemporaries, but have wrought an influence so colossal and so typical as to overshadow centuries and even thousands of years in the lives of great nations. Such were Homer, Moses, and Aristotle.

Types as entrance-ways to lesson unities.

In all our preceding chapters we have had opportunity to see the variety and importance of general truths in different studies. In our present discussion we discover that these general truths clothe themselves, to a large degree, in striking types. Pedagogically considered, these *types* should stand *at the entrance to the important avenues of truth in nearly every study*. This fact will be of great service to us when compelled to face the problem of selecting those topics in each study which contain the best lesson unities. This problem is now upon us in American schools. We are now sifting out and measuring up the school branches more thoroughly than ever before. The whole question of relative values of studies and of the comparative worth of different topics in a study is distinctly before our schoolmasters. The presumption of our present discussion is that the key to the interpretation of this problem will be found in the selection of types.

Summing up the answers to objections against the use of types, we may say: the well-selected type is a short-cut in the inductive thought movement from particular to general. But it is a short-cut which not only children but even scientific thinkers are compelled to take. The well chosen type is a combination of the particular and the general, the graphic elements of the concrete being mingled with the striking features of the general notion. To disengage this general notion and bring it clearly into the light a comparison of several similar objects with the type is necessary. This is the natural and necessary method of abbreviating the inductive process. Without confusion, therefore, the type combines the two fundamental elements of all clear thinking: first the concrete basis and second the outline or index of a general truth.

In surveying some prospective field of study, as

Types as strategic points in instruction.

grammar or geography, before approaching it with children for purposes of conquest, shall we look upon it as a simple accumulation of facts, as a dead level of equally important truths, like so many hills of corn in a field, all to be cultivated with equal care, or as a few central truths to be completely mastered and applied? Is the field of knowledge like a field of ripened wheat, swath after swath of which is levelled by the sturdy reaper till all is laid low? We know that machines have been made to do this kind of monotonous, mechanical work even better than the sturdiest human arms. But the healthy acquisition of knowledge (in spite of its labor and partial drudgery) is not much like this monotonous level of mechanical effort. As one surveys a field of study he discovers that some facts are more important, tenfold, a hundred-fold more important than others. The field of knowledge resembles a mountainous district rather than a plain. To get the broadest views one must climb the highest ridges and summits. The knowledge embraced in any branch of study is not to be considered as a miscellaneous accumulation of facts, nor even as a well-ordered but monotonous series of facts, to be simply memorized or stored away; but it is a field of conquest which can be best brought under control by taking possession of its strong, *strategic positions*.

When the Prussians invaded France in 1870 they did not scatter themselves broadly over the whole of eastern France, stopping to plunder every village, city, and hamlet, but they concentrated their armies upon a few of the great frontier fortresses, till they had fought and forced them into surrender. When Strasburg and Metz and Sedan were taken, they had a firm hold on eastern France. They then turned the march of their converging hosts upon Paris, the citadel of France, with results which approved their wisdom. The reduction of the less important towns and districts was accomplished at their leisure.

In a similar way we should plan the conquest of a field of knowledge. As teachers, therefore, there is laid upon us the necessity, before entering upon the conquest, of surveying the field and of selecting the strategic points (the lesson units) upon which we will concentrate our forces.

How to sift out types.

It is interesting, by the way, to notice what masterly qualifications this implies in the person who lays out the series of lesson topics in a branch of study. It implies a mastery of the subject far beyond what is commonly regarded as a knowledge of its facts. *Facts must be sifted out, their relative worth and rank determined.* The types must be chosen which are most important in their individual influence and in their representative character. A review of the types worked over in Chapters II and XI will show that any given type is important for two reasons: first, because it stands deeply rooted in a large environment of facts, which find in it a central, controlling idea; and, second, because of its representative quality, by which, even in this deep setting of environing facts, it proclaims the characteristics belonging to a large class.

It may be stated as a general proposition that most of our lesson unities will find their embodiment in these types. But as all objects are more or less typical, and as every study contains ten times as many topics, all typical, as can be properly treated in school exercises, the necessity for a choice becomes apparent. It is customary to compromise this difficulty by spreading effort equally over the whole body of facts, in geography, for example; but this is like the farmer trying to cultivate a thousand acres when he has just force enough to cultivate properly a hundred. Some types are many fold more important than others, both in their root-connections and in their exhibition of generic qualities. This is shown above by numerous examples. Children often spend as much, if not more, time in learning some trivial fact as in the effort to grasp some event whose deeper meaning spreads light far and wide throughout a whole subject. Such a fact, interpreted in its causal relations and seen in its representative character, may swing the intelligence into the track of some universal law, as of gravitation or of evolution. Examples of this preëminence of certain types may be found in many studies. The oak tree is such a type among trees and vegetation, the beaver among animals, the silkworm or butterfly among insects, Mount Washington and Pike's Peak among mountains, the Mississippi among great rivers, Livingstone among explorers, Bismarck among statesmen, Darwin among scientists.

A historical illustration.

Certain events in history stand out as landmarks. The year 1787 records a number of important events, among them the meeting of the *constitutional convention at Philadelphia.* At the time it probably attracted much less attention than our last presidential election. But consider what a tree was there planted, what a growth it has since had, and how it has spread its branches over a continent. The constitution then adopted not only brought into union and harmony the demoralized and antagonistic governments of the thirteen colonies, but determined beforehand the framework of new commonwealths as they have sprung up in rapid succession. Politically, we have been living for more than a hundred years in the house which they built. We elect our governors, judges, congresses, and presidents at the time and in the manner which they specified. The constitution has been of unmeasured influence upon our history for more than a century and will continue, in all probability, to augment its influence for centuries to come. We pride ourselves also that it has been the type of popular, democratic governments the world over. It has been the model upon which other free, representative states in South America and Europe have been constructed. In other words, in studying the work of the federal convention, we are dealing with a few of the fundamental principles of government in their preëminent type, the constitution of the United States. The meeting of the constitutional convention is an event of such transcendent importance, the causes which led up to it are so deeply rooted in the early history of the colonies, it brought together so many of the wisest heads of the time in great deliberate council, and the influences that have flowed from it are so vast, that we can afford to spend more time upon it than upon any other single event in American history. Other so-called important events of 1787, as compared with this, are insignificant.

The meaning of such an event lies in its deep generic quality and in its wide-reaching causal relations. Such a topic is a citadel of strength in historical study. It cannot be adequately surveyed in a single recitation. It will take many recitations to gather up and focus the necessary tributary facts, to organize them around the central event. But when it has been properly done, a view-point has been gained from which we may rationally survey and interpret a large extent of otherwise unrelated events.

Types as organizing centres.

Now it is evident that if so much time is given to the extended treatment of such an important event, a corresponding amount must be subtracted from the time now given to a number of lesser topics. It may mean that the selection and adequate treatment of such types involves the expulsion, as topics, of a host of minor events. But many of them will reappear in their proper setting as secondary to the main topics. It is clear that such a full handling of central types is based upon a rigid ranking of events according to their true value.

The concentration of effort upon such topics, with their related material, enables us to ground our work upon those natural laws of association upon which memory and reason rest. The links which bind together such a large complex of facts are the ideas of *similarity* and of *causal relation*. The body of facts contained in any given study needs to be organized around a few centres, which thus reduce a large and intricate collection of data to comparative simplicity, and put it under easy control. Just as a city in the midst of a productive and populous region, by means of its numerous radiating lines of traffic, centres in itself the collection and distribution of products, so an important type, by its representative character and causal relations, centralizes and organizes a large accumulation of facts, and leaves thought free to issue forth in every direction from this stronghold, working its interchanges along the great traffic lines of association.

The selection of the important typical lesson unities in a study will be found later to pave the way for the solution of two large problems which the teacher is sure to meet, — correlation and scientific arrangement.

In the very process of careful selection and elaborate treatment of a type we meet unavoidably this *correlation,* or close interrelation of studies. In treating the Hudson River as a type we come upon the mountains, forests, water power, and manufacturing of its upper course; the navigation, cities, railroads, and scenery of its lower course; its commercial connections by canal with the coal fields of Pennsylvania, with the forests of the north by canal to Lake Champlain, with the Great Lakes by the Erie Canal along the Mohawk to Buffalo. The harbor and city of New York, and their easy connections with the Great Lakes and the upper Mississippi Valley, are on one side, with the Atlantic coast and the marts of Europe on the other. Historically, the Hudson is very attractive: Hudson and his early exploration and his contact with the Indians, the first Dutch settlers, Washington and his campaigns along the Hudson, the old forts and battle scenes, Arnold and André, Burgoyne's invasion and its attendant battles and strategies. In literature, Irving has made certain spots on its banks as famous as the old battle grounds. These stories our children use in their regular reading lessons. From a purely scientific standpoint, the great drowned river valley, its palisades, mountains, and incoming ocean tides are at once suggested.

The moment we begin to treat the Hudson River as an important and typical object in this rich and fruitful way, we are certain to run across these relations of the geography to history, literature, and natural science. Not that we are forced in the geography lesson to give the historical or literary or scientific treatment. But the Hudson River as a whole has these historical and scientific and literary facts and associations as well as the geographical. Nor can we dig deep among the geographical facts without running across these root-connections with the other studies. It is just at this point that the problem of correlation must be met and solved, not by mixing and jumbling the studies, but by tracing in each study these deeper relations to others.

So long as geography study consists in locating and learning the names of cities, rivers, and mountains (this surface survey of geographical facts), we shall not be troubled with the problem of correlation. But take some large geographical type and begin to turn up the deep, rich fund of detailed knowledge involved in it, and at once this strong network of deep and important relations between studies is encountered.

Not only is there an important collection of geographical facts (physical, commercial, industrial, and political), all firmly linked together by strong causal relations, but naturally included within the same area and explained by this very environment are the scientific, historical, and literary facts which cannot be kept out of sight. They are all bound up together in one great picture or panoramic view in the very setting in which nature and the growth of human society have put them.

The object of correlation is not to invent or fix up relations between studies, but simply to see facts and objects in those natural and necessary relations in which they actually stand and without which they have no meaning. *The concentration of study upon an important type* is the choice opportunity for getting into a nest of these naturally correlated facts. The superficial survey of facts in a branch of knowledge and the strict isolation of studies from one another are the teacher's artificial method of excluding life and meaning from studies.

Such types are not at all difficult to find in geography, history, natural science, and literature. The itemized, connected life history of an oak through its years of germination, growth, fruit-bearing, and final decay, is a close study of the tree in its relations to minerals and soils, of the physical and chemical processes in the tissues, bark, and leaves, of atmospheric and climatic condition, of insect and bird life among its branches, and of the clouds and sunlight above its head. The oak tree as a botanical specimen is rooted and all its parts live in the close environment of the other sciences. Here are several sciences in such intimate relation that no absolute lines of distinction can be drawn. Practically, however, there need be no mixing or confusion of sciences because the central topic is a purely botanical one and puts the other sciences under tribute only to the extent that they can help to understand the important phases of the tree's life.

Types as related to scientific classes and laws.

But this typical object, standing in this environment of closely related facts, towers above them, and teaches still higher truths, setting into prominence those larger *scientific classifications* and laws which interpret the phenomena of nature and of human life on a broad scale. Looked at from the standpoint of botany, the full study of the oak brings out a great type of vegetable growth. The type idea, when clearly revealed by comparisons with other trees and vegetable forms, not only stands as the representative of forest trees, easily observed by all children, but illustrates similar processes throughout all forms of vegetation. Even a child may thus wake up to the presence of great, universal laws, closely observed in a few typical cases, but easily detected in many others. The elaborate study of types is, therefore, the best approach to scientific classes and principles.

Isolate one of these type objects, tear it loose from its root-connections, and it is no longer a type. Its deep setting and intimate vital relation to environment constitute a share of its typical character. As the oak tree, uprooted by the storm, lies dead, no longer a type of living forces, so a lesson topic loosened from its natural setting has no life, no vital force as educative material.

In summarizing the points of value in type studies we may note: —

1. The type furnishes us a centre around which to collect the material for induction in the first four steps.

2. The type is extremely concrete while strikingly characteristic in its exhibition of generic qualities.

3. The sifting out of the best types in a study gives us a series of great *lesson units*, or strategic points, whose mastery gives us the control of a whole study.

4. The deepening of the type study uncovers those radical relations between studies which give a real meaning to the term *correlation*.

5. The general classes and truths, which the types prefigure, constitute the scientific framework of the study and at the same time furnish the nuclei for lesson unities capable of treatment according to the five steps of instruction.

CHAPTER XI

ILLUSTRATIVE LESSONS

IN this chapter three lesson unities are worked out through the five formal steps, for the purpose of illustrating more definitely the *inductive-deductive movement* in the treatment of such important topics.

To work out such a lesson unity through all the essential steps may require several recitation periods. The lesson on irrigation will take probably four or five recitation periods of half an hour each.

The Irrigation of Arid Lands

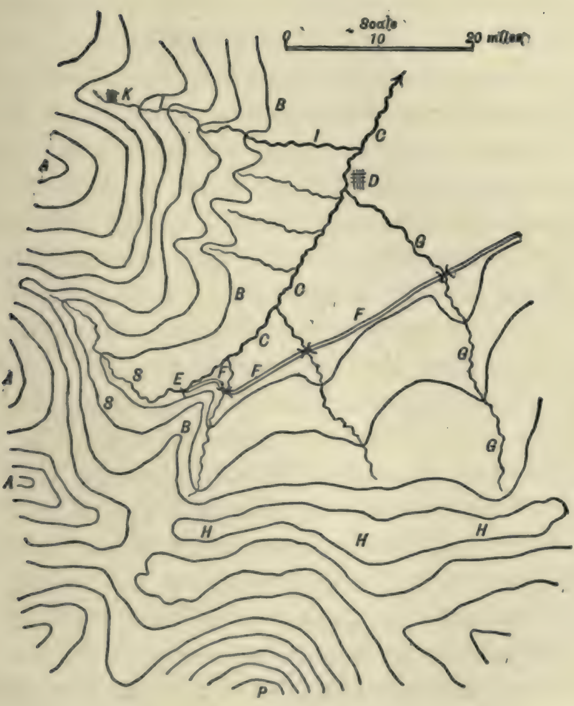
First Step. — How can the dry lands of some of our far Western states be watered from the rivers?

How are our farms and gardens in Illinois supplied with moisture? Do you know of any of our states where there is little or no rainfall on the plains? Point out on the map the dry region along the eastern base of the Rocky Mountains. What do you know from your geographies of the climate of this strip of country? What business may be carried on here? Grazing and mining. Have you heard of people who crossed the "plains"? Where are the plains? Recall Fremont's trip to the Rocky Mountains. Can crops of grain or vegetables be raised on the plains? What are the difficulties? What rivers flow across this region and in which direction? Would it be possible to get the water from these rivers upon the dry uplands, so as to use them for purposes of agriculture? Tell what you may have heard of irrigating ditches.

Second Step. — The strip of country just east of the mountains in Colorado is very dry. There is almost constant sunshine, and very little rain, so that, though the soil is good, it bears only a thin, scattering buffalo grass, and most of the year the country looks almost as barren as a desert. To explain fully the process of irrigating by ditches, "The Big Ditch," which is drawn from the South Fork of the Platte near Denver, is described as follows: —

In order to show the position of this ditch and its relation to the river, the mountains, and the slopes, a map of the region about Denver is necessary, showing the South Fork of the Platte River, the mountains and foot-hills, and the slope on which the ditch is laid out.

The South Fork of the Platte River, after draining South Park, breaks through the foot-hills and descends to the northeast through the great plain



A. A. A. — Main chain of the Rocky Mountains.
B. B. B. — Foot-hills.
C. C. C. — South Fork of the Platte.
D. — Denver.
E. — The dam.
F. F. F. — The ditch.
G. G. G. — Cherry creek.
H. H. H. — Watershed.
I. I. — Clear creek.
K. — Georgetown.
P. — Pike's Peak.
S. S. — South Park.

lying east of the mountains. Southeast of the Platte a high watershed extends out from the mountains, separating the valley of the Platte from the valley of the Arkansas, still farther south. Pike's Peak, a prominent spur of the mountains, lies a little south of this watershed. From the foot-hills the country slopes eastward toward the Platte as indicated by the small streams descending from the mountains. On the other side of the Platte the land slopes gradually from the height of land to the northwest, as indicated by Cherry creek and other streams, which, however, are dry most of the year.

This gently sloping land has a good soil, but on account of the dry weather has only a scant growth of buffalo grass, useful for cattle-grazing. Denver lies at the junction of the Platte River and Cherry creek, and other cities like Georgetown and Black Hawk are located in the valleys of the mountains. The Platte River emerges from the mountains or foot-hills about twenty-one miles southwest of Denver.

Between the Platte River and the watershed on the southeast is a large area of gently sloping country, part of which it was proposed to bring under irrigation by means of a large ditch taken from the Platte River. Can you devise a plan by which the water from the river can be brought upon this plain? Where should the ditch begin, which way should it extend, and in what direction should the water flow through it? In order to get the water at a high level, so as to carry the water as high along the slope as possible, the engineers, following the stream into the mountains, constructed a dam in the river three miles above the point where it emerges from the foot-hills. The river itself descends rapidly as it rushes down through the cañon and out into the open plain. But the big ditch which is taken from the river at the dam is carried along the cañon in an artificially constructed channel with a slow current, so that, as it emerges from the mouth of the cañon, the channel of the ditch is some twenty feet or more higher up than the current of the river. What special advantage (for irrigation) is it to have the level of the ditch twenty feet above the current in the river?

Near where the river emerges from the mountains a small stream comes into the Platte from the south, and the Big Ditch is turned back along this valley, and, after crossing it, is kept as far back from the Platte River and as high up along the slope as possible. Why do they wish to keep the ditch as far away from the Platte as possible? As it extends to the northeast the distance from the Platte River gradually increases till at Denver it is eight or ten miles from the city, where it crosses Cherry creek.

After reaching the plain just east of the mountains, the Big Ditch was made by digging a channel in the earth, about forty feet wide, and when the water was let in, about six or seven feet deep in the middle. In digging this great trench on which side of the channel would the dirt be thrown, and why? The digging required the labor of hundreds of men with teams and scrapers and other machines for removing dirt. The work lasted many months and cost many thousands of dollars. In some places the ditch resembles great railroad cuts through a hilly country.

When it was brought to one of the deep gullies or dry runs, which are frequent on the plains, it was necessary in some way to get it across. The largest and widest of these is the valley of Cherry creek, a half mile or more in width in many places. What can you suggest as a good plan for getting a large ditch across one of these valleys? Sometimes a "flume" or aqueduct was built consisting of a great wooden trough, supported by heavy piles or posts, like a railroad bridge. This trough must be wide and deep enough to carry the full stream of water in the ditch. The seams and cracks between the boards were filled and calked up so as to permit as little leakage as possible.

The water with which the ditch is supplied comes from the river. But how does the river get its supply in such a dry country? It has been observed that there is a much greater rainfall and snowfall among the mountains and along the higher ridges than on the level plains to the east. The cold mountain sides condense the moisture into rain and snow. The mountain peaks and ranges have frequent rain and snowstorms when no moisture falls upon the plains. The forest and vegetation upon the mountain slopes hold back the moisture also. In the spring, when the warm sun melts the snows, and in April and May when the spring rains come, the rivers are flooded. An immense amount of water, at this season, escapes down the river and is lost unless it can be stored up in reservoirs for use two or three months later, when it will be greatly needed. Where could such reservoirs be built? These reservoirs were constructed at various points along the Big Ditch by building dams across the valleys or along the edge of tracts of low-lying land. But in spite of these reservoirs the amount of water is sometimes insufficient to supply all the land during the spring and summer season of irrigation.

Many smaller ditches were built by the farmers or by small irrigation companies before the Big Ditch was constructed in 1881. Although lower down on the river, they have the prior claim, or water right, and it is only after they have been supplied that the Big Ditch (later built) can take the water from the river. Who settles such disputes? The legislature of the state, meeting at Denver, makes the laws regulating the division and use of the water supply among the different ditch companies.

How can the water be drawn off from the ditch and distributed to the farmers? When the Big Ditch has been liberally supplied with water, it is drawn off through wooden boxings or through gates to irrigate the separate fields. The boxing through which the water escapes from the main ditch passes under the embankment on the lower side. At the upper end it is below the level of water in the ditch. At the lower end is an upright slide or board which, being lifted, lets out the water, or by dropping it and throwing loose dirt about it in the boxing, the flow of water is stopped. Regular officers, or water inspectors, are employed to pass along the ditches and to regulate the amount of water sent out to the different farms, also to keep careful watch over the ditch banks, reservoirs, flumes, etc. Sometimes, in case of rains and freshets, the ditch threatens to fill up and break over its banks, wasting the water and injuring ditch and crops. In such cases how can the excess of water be turned off? Gates are opened at the flumes which allow the water to run off down the valleys. Usually a larger boxing lets out enough water to form quite a good-sized ditch, from two to six feet across. This may skirt the edges of a number of farms and from it the water is turned off in small channels to the separate farms and fields. At what point should a ditch enter a farm? The fields are irrigated in different ways. A wheat-field or meadow is sometimes flooded; in a corn-field the water is often run down in small furrows between each two rows. When sufficient moisture is secured for a thorough wetting, the mouth of the ditch is closed up with a few shovels of dirt, and for a week or two the water is not turned on again. Most of the land slopes so regularly and evenly toward the river that it is possible to irrigate it fully.

How do the farmers measure and pay for water? The ditch company usually sells the water to the farmers by the inch, the amount of water passing through a hole an inch square being enough to irrigate an acre. The cost of an inch of water is sometimes from $1.50 to $2.50. The ditch company, having spent large sums of money in digging the ditch and in buying up the land, is justified in charging a rental for the use of the water.

The effect of bringing a district of apparently desert country under irrigation is very striking. Fields of grain, meadows of alfalfa and other grasses, corn-fields, and vegetable gardens cover the country. Groves of shade trees and fruit orchards soon grow up, roads are laid out, fences, barns, and houses built, and the whole country takes on much of the appearance of a flourishing Illinois prairie in springtime. Wells are dug and are well supplied with water, so thoroughly does the water saturate the whole soil. In the fall and winter the ditches are left dry. Land below the ditch (between the river and the ditch) becomes worth $40 or $50 to the acre, while just as good land above the level of the ditch, only a few rods away, is worth but $5 or $6 an acre for grazing purposes. It is claimed by the farmers that irrigation is a more reliable and satisfactory method of agriculture than farming in Iowa or Illinois, where dependence must be placed upon the natural rainfall. What are the advantages of farming by irrigation? One farmer told me that in thirty-three years he had never had a failure of a crop upon a single field. The abundant sunshine can be counted upon to ripen grains and fruits.

The northwest slope of the Platte River (between the river and the foot-hills) is supplied with water in a somewhat different way. Quite a number of small streams come down out of the mountains and foot-hills and wind eastward across the slope to join the Platte. Between the mountains and the river at Denver, this rich level or rolling plain is about ten miles wide and is a garden of beauty and abundance. The small mountain streams moving eastward toward the Platte are dammed up at favorable points so as to form ponds or lakes. From one of these lakes the slopes lower down the valley of the little stream may be supplied with water by small ditches running out from the lake on either side. A stream may be dammed up in several places and thus constitute a series of irrigating lakes. From the foot-hills a thousand feet above the plain one can count more than a score of these small lakes which preserve the abundance of the spring waters for the use of the farmers in the summer time.

On each side of the Platte River, therefore, there is a strip of well-irrigated land for many miles. What sort of market would you expect for the products of irrigation? The city of Denver, with one hundred and thirty thousand people, furnishes a good market for much of this produce. Locate the chief mining towns within one hundred fifty miles of Denver. An examination of the map of Colorado will show along the foot-hills a series of mining towns such as Black Hawk, Boulder, Georgetown, Golden City, and Cañon City, while a few miles back on the plains are towns and cities like Greeley, Denver, Colorado Springs, and Pueblo, which make a large demand for vegetables, grain, grasses, and fruits. Unless they are raised by irrigation in Colorado, these necessary supplies will have to be shipped several hundred miles, from Kansas or Nebraska, or from Utah. A ready market at good prices is pretty certain to be found near at hand for all the products raised by irrigation.

In a brief review of the Big Ditch point out clearly its relation to the climate of Colorado, to the surface features and soil, to the rainfall, to cities and mining, to government, and to commerce and population.

The first important river to the south of the Platte is the Arkansas, which issues through the main ridge of the Rockies by way of the Grand Cañon not far from Cañon City. As it comes out upon the eastern plains, its waters are drawn off in ditches to water the lower lands near the river. Even as far as western Kansas it is used for irrigation by means of ditches. In southern Colorado and west of the main chain of the Rockies, the Rio Grande, as it flows southward through San Louis Park, is drawn off in ditches to enrich this fruitful valley, and southward into New Mexico the waters of this river are used for irrigation. In northern Colorado and in southern Wyoming the North Fork of the Platte and its branches are used for irrigation, and large reservoirs or artificial lakes, many miles in length, have been constructed for the purpose of holding the spring floods in reserve.

Third Step. — Compare now these four rivers — the South Fork of the Platte, the North Fork of the Platte, the Arkansas, and the Rio Grande — as related to the mountains and plains, as situated in reference to the mining cities, and as illustrating facts of irrigation as now carried on. What is the relative importance of the small streams as compared with the large ones for purposes of irrigation?

Fourth Step. — In summing up the common features of these river valleys we may observe that they are all in an arid region, that they derive their water supply from the mountains; as they emerge into the plains at the foot of the mountains their waters are carried out to enrich the plains by means of artificial channels. The smaller tributary streams are used in a similar way. The presence of important mining cities near these river valleys and in them makes a ready market for all the products raised by irrigation. The present wealth and population of these districts depend largely upon the irrigating ditches.

Fifth Step. — The school children, having seen clearly the conditions under which irrigation is possible, and the means by which it is carried on, will be able to extend its application over a number of states and territories where similar conditions of climate, soil, and surface features are repeated. By a study of the maps and the descriptive parts of their geographies they should be able to locate the arid regions and determine what rivers are useful for irrigation. Are the rivers of California irrigation streams? Of Utah? Of Washington and Montana? Finally locate the arid regions of the United States and compare them in size with the portions which have sufficient rainfall for purposes of agriculture. Could the rivers of your native state be used for purposes of irrigation if rain were lacking? For example, the Illinois, the Hudson, the Minnesota, the Tennessee? What have you heard of irrigating farms in Dakota and other states by means of artesian wells? Various attempts of this sort have been made. What are the difficulties likely to be?

In the later study of Africa, Asia, and South America we may interpret plans of irrigation in other lands and compare them with ours.

The Battle of King's Mountain and the Temper of the Common People during the Revolutionary War

First Step. — We will see how the backwoodsmen of North Carolina, Tennessee, and Virginia prepared a surprise for Cornwallis and the British army. After the battle of Camden, what was the condition of things in the Carolinas? Where was Gates's army? What was Cornwallis's plan? Will the people of the South attempt any further resistance to Cornwallis?

A survey of the situation at this time will lead the children to the conclusion that Cornwallis and the British were in high hopes after the battle of Camden, and that the Americans were scattered and discouraged. Let the class study the maps and books, and get a clear view of this discouraging situation. Cornwallis seemed to be in full control of South Carolina, and by coöperating with troops sent to Virginia by Sir Henry Clinton was planning to bring North Carolina and the whole South into complete subjection to the royal cause. We will see how the common people acted under these depressing conditions.

Second Step. — In the mountainous districts of western Carolina, in Tennessee and Virginia, were scattered settlements of backwoodsmen who had never submitted to the king. Cornwallis now sent Major Patrick Ferguson, with twelve hundred men, on a foraging march into the rough country of western North Carolina, with instructions to scour the mountain region between the Catawba and the Yadkin, harass the patriots, encourage the Tories, and gather in royalist recruits. At Charlotte, in North Carolina, he was to rejoin Cornwallis's army. What sort of country had Ferguson to travel through? Would the backwoodsmen be likely to disturb him? What sort of training in fighting had they had?

As Ferguson marched into this wild region he found the people very unfriendly. Instead of selling their provisions to British soldiers, they distressed them by shooting down stragglers and messengers, and cutting off supplies from the British army. Neither Ferguson nor Cornwallis was expecting serious opposition from large bodies of American troops. Yet it was very difficult for the British to march through such a rugged and wild country. Besides, the Americans could sometimes bring together considerable companies of swift horsemen, who did great damage to detachments of the British army.

The story of the battle of King's Mountain is thus told in Irving and Fiske's "Washington and his Country," pp. 423–427. Let the teacher tell the story, throwing in questions when needed.

"This hostility of the patriots was a sore annoyance to Cornwallis, depriving him of all intelligence concerning the movements of Ferguson, whose arrival he was anxiously awaiting. That doughty partisan officer was on his way to join Cornwallis when a chance for a signal exploit presented itself. An American force under Colonel Elijah Clark, of Georgia, was retreating to the mountain districts of North Carolina, after an unsuccessful attack upon the British post at Augusta. Ferguson resolved to cut off their retreat. Turning toward the mountains, he made his way through a rugged wilderness and took post at Gilbert-town, a small frontier village of log houses. He was encouraged to this step by the persuasion that there was no force in that part of the country able to look him in the face. He had no idea that the behavior of his followers had arrayed the very wilderness against him. (What sort of treatment had the patriots in the South received at the hands of the British?) The scattered inhabitants of the mountains assembled without noise or warning; a hardy race, half huntsmen, half herdsmen, inhabiting deep, narrow valleys and fertile slopes, adapted to grazing, watered by the coldest of springs and brightest of streams, and embosomed in mighty forest trees. Being subject to inroads and surprisals from the Indians, a tacit league existed among them for mutual defence, and it only needed, as in the present instance, an alarm to be circulated through their settlements by swift messengers to bring them at once to the point of danger. (Against what Indians had the early settlers of this region fought?) Now from the upland regions of Kentucky, Virginia, Tennessee, and the Carolinas these bold backwoodsmen assembled to the number of three thousand, led by their militia colonels, Campbell, Shelby, Williams, Cleveland, McDowell, and Sevier.

"Threatened by a force so superior in numbers and fierce in hostility, Ferguson remembered the instructions of Cornwallis, and breaking up his quarters he pushed for the British army, sending messengers ahead to apprise his lordship of the danger. Unfortunately for him, his missives were intercepted. (What might Cornwallis have done to help Ferguson?)

"Gilbert-town had not long been vacated by Ferguson and his troops when the motley host of mountaineers thronged in. The greater part were on horseback. Some were in homespun garb, but the most part in hunting shirts, occasionally decorated with colored fringe and tassels. Each man had his long rifle and hunting-knife, his wallet, or knapsack, and blanket, and either a buck's tail or sprig of evergreen in his hat. Here and there an officer appeared in the continental uniform of blue and buff, but most preferred the half-Indian hunting dress. There was neither tent nor equipage, neither baggage nor wagon, to encumber the movements of that extemporaneous host. Prompt warriors of the wilderness, with them it was 'Seize the weapon — spring into the saddle — and away!' In going into action, it was their practice to dismount and tie their horses, so as to have them at hand for use after battle, either to pursue a flying enemy or make their own escape by dint of hoof.

"There was a clamor of tongues for a time at Gilbert-town; groups on horseback and foot in every part, holding hasty council. Being told that Ferguson had retreated by the Cherokee road toward North Carolina, about nine hundred of the hardiest and best mounted set out in urgent pursuit, leaving those who were on foot, or weakly mounted, to follow as fast as possible. Colonel William Campbell, of Virginia, having come from the greatest distance, was allowed to have command of the whole party; but there was not much order or subordination. Each colonel led his own men in his own way. A rapid and irregular march was kept up all night in murky darkness and through a heavy rain. About daybreak they crossed Broad River, where an attack was apprehended. Not finding the enemy, they halted, lit their fires, made their morning's meal, and took a brief repose. By nine o'clock they were again on the march. The rainy night had been succeeded by a bright October morning, and all were in high spirits. Ferguson, they learned, had taken the road toward King's Mountain, about twelve miles distant. When within three miles of it, their scouts brought in word that he had taken post on its summit. The officers now held a short consultation on horseback, and then proceeded. The position taken by Ferguson was a strong one. King's Mountain rises out of a broken country, and is detached, on the north, from inferior heights by a deep valley, so as to resemble an insulated promontory about half a mile in length, with sloping sides excepting on the north. The Mountain was covered for the most part with lofty forest trees, free from underwood, interspersed with boulders and masses of gray rock. The forest was sufficiently open to give free passage to horsemen. As the Americans drew nearer, they could occasionally, through openings of the woodland, descry the glittering of arms along a level ridge, forming the crest of King's Mountain. This Ferguson had made his stronghold, boasting that 'if all the rebels out of hell should attack him, they could not drive him from it.' (Why was this a strong position for Ferguson's army? How could the Americans best manage the attack?)

"Dismounting at a small stream which runs through a ravine, the Americans picketed their horses, or tied them to the branches of the trees, and gave them in charge of a small guard. They then formed themselves into three divisions of nearly equal size, and prepared to storm the heights on three sides. Campbell, seconded by Shelby, was to lead the centre division; Sevier with McDowell, the right; and Cleveland and Williams, the left.

"The divisions were to scale the mountain as nearly as possible at the same time. The fighting directions were in frontier style. When once in action, every one must act for himself. The men were not to wait for the word of command, but to take good aim and fire as fast as possible. When they could no longer hold their ground, they were to get behind trees, or retreat a little, and return to the fight, but never to go quite off.

"Campbell allowed time for the flanking divisions to move to the right and left along the base of the mountain, and take their proper distances; he then pushed up in front with the centre division. About four o'clock Campbell arrived within rifle distance of the crest of the mountain, whence a sheeted fire of musketry was opened upon him. He instantly deployed his men, posted them behind trees, and returned the fire with deadly effect. Ferguson, exasperated at being thus hunted into this mountain fastness, had been chafing in his rocky lair and meditating a furious sally. He now rushed out with his regulars, made an impetuous charge with the bayonet, and dislodging his assailants from their coverts, began to drive them down the mountain. He had not proceeded far, when a flanking fire was opened by one of the other divisions; facing about and attacking this he was again successful, when a third fire was opened from another quarter. Thus, as fast as one division gave way before the bayonet, another came to its relief; while those who had given way rallied and returned to the charge. (Do you think Ferguson could have planned his part of the battle better?) The nature of the ground was more favorable to the rifle than the bayonet, and this was a kind of warfare in which the frontier men were at home. The elevated position of the enemy also was in favor of the Americans, as it secured them from the danger of their own cross-fire. Ferguson found that he was completely in the hunters' toils, beset on every side; but he stood bravely at bay, until the ground around him was strewed with the killed and wounded, picked off by the fatal rifle. His men were at length broken, and retreated in confusion along the ridge. He galloped from place to place endeavoring to rally them, when a rifle ball brought him to the ground, and his white horse was seen careering down the mountain without a rider. (Could Ferguson with his men have broken through the ranks of the Americans on one side and have escaped?)

"This closed the bloody fight; Ferguson's second in command, seeing all further resistance hopeless, hoisted a white flag, beat a parley, and surrendered at discretion. One hundred and fifty of the enemy had fallen, and as many been wounded; while of the Americans, but twenty were killed, though a considerable number were wounded. (Why, do you think, had the British suffered more in killed and wounded than the Americans?) Among those slain was Colonel James Williams, who had commanded the troops of Ninety-six, and proved himself one of the most daring of the partisan leaders.

"Eight hundred and ten men were taken prisoners, one hundred of whom were British regulars, the rest loyalists. The rancor awakened by civil war was shown in the treatment of some of the prisoners. A court-martial was held the day after the battle, and a number of Tory prisoners, who had been bitter in their hostility to the American cause, and flagitious in their persecution of their countrymen, were hanged. This was to revenge the death of American prisoners hanged at Camden and elsewhere. (Would you expect the backwoodsmen to follow up this victory by marching against Cornwallis?)

"The army of mountaineers and frontiersmen, thus fortuitously congregated, did not attempt to follow up their signal blow. They had no general scheme, no plan of campaign; it was the spontaneous rising of the sons of the soil, to revenge it on its invaders, and, having effected their purpose, they returned in triumph to their homes. They were little aware of the importance of their achievement.

"The battle of King's Mountain, inconsiderable as it was in the numbers engaged, turned the tide of southern warfare. The destruction of Ferguson and his corps gave a complete check to the expedition of Cornwallis. He began to fear for the safety of South Carolina, liable to such sudden irruptions from the mountains; lest while he was facing to the north these hordes of stark-riding warriors might throw themselves behind him, and produce a popular combustion in the province he had left. He resolved, therefore, to return with all speed to that province and provide for its security."

Third Step. — (The class is supposed to have had earlier in their history study a complete account of Burgoyne's invasion, including the battle of Bennington. Recall Burgoyne's invasion and the events which led up to the battle of Bennington.)

The battle of King's Mountain at the South suggests the earlier battle of Bennington at the North. Under what circumstances did Burgoyne send Baum on the raid against Bennington? How did Baum prepare to meet the attack of the Americans? Burgoyne, after scattering St. Clair's army, followed up his victory with sending Baum on a foraging march toward Bennington. Compare this with Cornwallis after Camden.

Colonel John Stark and his Green Mountain boys assembled voluntarily at Bennington to repel invaders. Compare these with the backwoodsmen of Carolina and Tennessee who assembled under the six colonels at King's Mountain. The Tories and Indians at the North had exasperated the country people by cruelties. How had the Tories and British treated the patriots at the South? Baum took a strong position on a hill and awaited the attack of the Americans.

Ferguson at King's Mountain did likewise. Stark divided his army into three divisions and attacked on three sides at once. In both battles the militia attacked the British in a strong position and either killed or captured the whole body. The British leader was also killed or mortally wounded in each battle.

What was the result of each of these battles in its effects upon the movements of the principal armies? There were also certain points of difference worth noticing. At Bennington two battles were fought on the same day. At Bennington there were two leaders of the Americans; at King's Mountain, six, but they were not regularly appointed officers in either case.

Fourth Step. — As a result of this comparison we find a remarkable similarity even in the lesser details of these two battles, so far distant in place and time. Although they were small battles and insignificant in the number of troops engaged, yet they were very important in their influence upon two important campaigns. And what is also of much importance, they throw much light upon the spirit which the common people exhibited during the Revolutionary War.

At a time of great discouragement the people themselves, under their own neighborhood leaders, collect in large numbers, with such arms and equipments as they bring from their own homes, and attack and capture veteran troops in strong positions. In this respect exactly the same spirit and energy of character are shown by the backwoodsmen of Tennessee, Carolina, and Virginia as by the Green Mountain recruits and Yankee militia.

The common people, therefore, out of their own love of liberty, and on account of their great courage and energy, contributed much to the success of the Revolutionary War.

Fifth Step.[1] — Other battles of the Revolution may be called up and measured upon this standard of energy and patriotism as shown by the rank and file of troops. Take, for example, Bunker Hill, Stony Point, The Cowpens, Saratoga, and others. It is sometimes said that a few men, especially Washington, bore the burden of the war. How far were the spirit and energy of the common people responsible for the final success? Later in our history, both in time of war and in the enterprises of peace, the striking characteristics of the common people should be studied and their influence upon important events and movements observed and compared with earlier manifestations of the popular will.

This idea can be carried over also into the arena of political and social reform.

[1] The early colonial history abounds in illustrations of this popular energy as shown in Indian wars and in resistance to the tyranny of royal governors.

Parable of the Tares

Matthew xiii. 24–31

Several generalizations are suggested and a few are plainly taught by this parable. The tares were sown in the night, when people were asleep; so wicked thoughts are sown when people are spiritually asleep. The tares have an injurious influence upon the good grain; so bad thoughts and actions exert an injurious influence upon good thoughts and actions. When harvest time comes, the different growths shall be judged by the fruits that they bear, and hence, "By their fruits ye shall know them." The householder seems patient in allowing the weeds to stand; so God seems patient with the wicked people. The notes ordinarily furnished in connection with this parable state that the tares are a poisonous weed; so bad thoughts and actions act like poison in our lives.

These are all truths, however, that, while suggested by the parable, do not express the essence of its thought. They are really subordinate thoughts, and should better be neglected than receive much attention. The plainest truth involved is that a sure reward awaits the good and a sure punishment the evil. And that is the thought that Christ himself presents when he is called upon by the apostles to interpret the parable. However, many a teacher will feel convinced that there is another truth fully involved in the story, by means of which more influence can be exerted upon the child than by this one just named. That is presented through the fact that the householder commands his servants to let the tares stand with the wheat, because the servants cannot remove the one without injuring the other. This, interpreted, means that in this world, though we would often like to banish evil from among us, we do not know enough to separate it from the good, and if we attempted to do so we should make an abundance of mistakes. Hence, we should let both grow together until the harvest, or until the end of the world; and we should not attempt to judge and condemn people, thinking that we see clearly what is good in them and what is bad. The generalization, tersely stated, would be, "Judge not, that ye be not judged." This is the one chosen to be presented here according to the five Formal Steps. The children are thought of as being at least ten years of age, and perhaps somewhat older. The majority of the questions following, although not all, could be given to ten-year-old children.

Aim. — Let us see what Christ meant by his story about removing weeds from the wheat.

1. Have you found weeds in a garden of your own? How were they gotten rid of? Why is that so necessary? Is there any danger to the other plants in so doing? Have you seen weeds growing in grain in

the country? Where? In what grains? Is it more or less dangerous to remove weeds from wheat than from your flowers or vegetables in the garden? Why? What, then, does the farmer do with them?

2 *a*. Now let us listen to the story that Christ told about removing weeds from the wheat. That was in Palestine, and the particular weeds he mentioned are called tares. They are said to look very much like wheat. (Read Matthew xiii. 24–31.) (If time allows, at least a portion of this parable could be developed instead of read.) The children, after hearing or reading the parable, relate the same probably two or three times, in order to see clearly the concrete situation. Proceeding, we say, Why, then, were the servants not allowed to pull up the tares? The chief answer is that in so doing they would root up the wheat, because the tares stand so close to the wheat that one could not be pulled up without injury to the other.

2 *b*. Christ's disciples hardly knew what he meant by this story, and they asked him about it. Do you think you can possibly tell what is meant? Let us see. He says that a man having a field of grain may be compared with the kingdom of Heaven. If so, whom might the sower represent? Answer — Christ. And what would the field be? Answer — the world. Who would be meant by the good seed? Who by the tares? When will the harvest be? Who are the reapers?

3. Are there many tares or wicked people in the world? Give examples, as thieves, murderers, etc. Those servants thought it would be wise to separate the tares from the wheat and gather them up; have you ever had the same feeling about the bad people in the world? Have you wanted to do away with the evil and leave only the good? Well, now, suppose you were allowed to separate the good from the bad; if this permission were given you, how would you go at it? (1) On which side, the good or the bad, would you place Jacob? You remember he deceived his aged father. (2) What would you do with Moses? Remember that he killed a man. How did God regard him? (3) On which side would you place Mary Magdalene? What did Christ think of her? (4) Where would you place the Prodigal Son? (5) Would you regard Judas as belonging among the wheat or the tares? You remember he was one of the disciples, and was trusted by them, although he betrayed Christ later. (6) What would you do with the brother of the Prodigal Son? He stayed at home and worked. (7) What would you do with your friends and acquaintances? Why are you confused in these cases? Once more, Why would not the householder allow his servants to pull up the tares? Answer, They were too near the wheat stalks and too much like them to be separated from them. Does that help you any here? How? Answer, (1) The evil is so near the good that they are both found in

one person; (2) The good and bad often appear so much alike that often we are not able to tell them apart. What conclusion, then, do you reach about our trying to separate the good from the bad? But what if we went ahead and decided to attempt it nevertheless? Wrong!! Who, then, will attend finally to this separation? Why are angels chosen for it rather than men?

4. (1) Which verse in the parable most clearly calls for delay in separating the bad from the good? Look them through to see. Verse 30. "Let both grow together until the harvest." Are you convinced that this applies as much to good and bad people as to wheat and tares?

(2) Do you call to mind another verse that brings to mind a similar thought? You have heard it often. It begins with the word *judge*. Matthew vii. 1. *Judge not.* Let us learn these two verses, then, and hereafter when the parable of the tares is called for, you may state its chief thought for us by these two verses.

5. (1) At the close of this talk, Christ said, "Who hath ears to hear, let him hear." Why do you think he said that? What did he want them to hear?

(2) Is it true that people have failed in times past to listen to this teaching? What examples from history show this? St. Bartholomew's massacre, witchcraft, the Jews' treatment of Christ, etc.

(3) Have you ever been misjudged yourself? How did you feel about it?

(4) Have you ever misjudged others? How did you feel about it then, when you discovered that you had been wrong?

(5) Have you ever really attempted to stop judging others so freely? ("Who hath ears to hear, let him hear.")

(6) What comforting thought do you find in this lesson? Answer, That we should not be too much discouraged at seeing wickedness allowed to continue. We are taught not to be too impatient over the matter.

CHAPTER XII

LAWS UNDERLYING PROCESSES IN TEACHING

If the leading thoughts thus far presented are true, there are certain steps in instruction that are universal. No matter what the study be, whether Latin, mathematics, science, or some other, there is a certain order that the mind must follow in acquiring knowledge. Through the old related experiences (first step, preparation) new individual notions are reached (second step, presentation); these are compared and their essential characteristics abstracted (third step, comparison), and the resulting general truth is worded (fourth step, generalization); this generalization finally receives application (fifth step, application). Since these steps are passed through in this order without reference to the nature of the subject-matter presented, they are rightly called the Formal Steps of Instruction. They indicate the order of the movements of the mind, or of the forms through which thought must pass in reaching full maturity.

Now, law is reached the moment that a certain order is shown to be uniform; for a law is nothing more than a statement of a uniform sequence, and a law of teaching, the statement of a uniform sequence in the process of learning. Hence, it is clear that these natural or Formal Steps of Instruction simply embody the laws of teaching.

I. The most prominent one, often known as the *law of induction* and discussed particularly in Chapter V, may be stated thus: The order of steps in the acquisition of knowledge is: (*a*) individual notions; (*b*) general notions. Eminent authorities on teaching now generally agree upon this law, and it is stated by Huxley in these words:[1] —

"The subject-matter of biological science is different from that of other sciences, but the methods of all are identical.

"And these methods are: —

"1. Observation of facts — including under this head that artificial observation which is called experiment.

"2. That process of tying up similar facts into bundles ticketed and ready for use, which is called comparison and classification, the results of the process, the ticketed bundles, being named general propositions.

"3. Deduction, which takes us from the general proposition to facts gained — teaches us, if I may so say, to anticipate from the ticket what is inside the bundle. And finally, —

"4. Verification, which is the process of ascertaining whether in point of fact our anticipation is a correct one.

[1] Lay Sermons, p. 83.

"Such are the methods of all science whatsoever."

Considering 3 and 4 as belonging to step 5, the essential aggreement of the preceding statements with this quotation is evident. It is well to ask what other method there is that could better be followed than this.

II. Another law discussed especially in the first part of Chapter VI is commonly known as the *law of apperception*, and may be stated in these words: New thoughts can be comprehended only by the help of old thoughts; also, new emotions (and volitions) are dependent both in quality and in strength upon old emotions (and volitions). The same general thought is expressed by Dr. W. T. Harris as follows:[1] —

"Inasmuch as instruction is the leading of the ignorant into knowledge by translating the unknown into the known, there are two factors involved: (*a*) the unknown subject; (*b*) the stock of knowledge already possessed by the pupil. The knowledge already possessed is the means by which the unknown can be grasped and retained. All learning is a translating of an unknown into a known, just as the learning of a foreign language proceeds by translating the unfamiliar words into familiar words, and thereby changing the strange into the familiar. This being so, unless constant reference is had by the teacher to the stock of familiar ideas belonging to

[1] Rosenkranz, "Philosophy of Education," p. 99.

the pupil, there is imminent danger to instruction. It may pass off into the process of exchanging unknown words for unknown words — a movement entirely within the realm of the unfamiliar. Such a process is not instruction, whatever else it may be."

III. *The law of aim*, discussed in Chapter VI, is one practically agreed upon in daily life, but until recently it has not been dignified by teachers as a law affecting their instruction. Nevertheless, they are coming rapidly to agree that a definite and attractive aim is a condition of the most effective work of any kind, and hence that a clear aim should be daily fixed in each recitation as elsewhere. Upon this point Dr. Wilhelm Rein says:[1] —

"The pupil should know beforehand what is coming if he is to bring all his powers to bear upon the work of learning; and it is easier to call out all his effort if he knows beforehand what is to be gained. To conduct a child along an unknown road, toward an unknown object by means of questions and hints, the purpose of which he does not see, to lead him on imperceptibly to an unknown goal, has the disadvantage that it develops neither a spontaneous mental activity nor a clear insight into the subject. Having reached the end of such a line of thought, the pupil looks about himself bewildered. He cannot survey the road which he has just gone over, he does not com-

[1] "Theorie und Praxis des Volksschulunterrichts. Das erste Schuljahr," p. 103.

prehend what has happened to him. He stands at the goal but does not see the relation that the result bears to the labor performed. He does not rise to that satisfactory mental activity and favorable disposition of mind which are stimulated by the pursuit of a clearly set purpose."

IV. *The law of self-activity* has been insisted upon by all great educators in modern times, particularly, however, by Froebel. It may be briefly stated thus: proper development is possible only through a high degree of self-activity. The law was discussed especially in reference to the development method of teaching in the latter part of Chapter VI. Herbert Spencer's opinion is shown in the following quotation[1] —

"In education the process of self-development should be encouraged to the fullest extent. Children should be led to make their own investigations and to draw their own inferences. They should be told as little as possible, and induced to discover as much as possible. Humanity has progressed solely by self-instruction, and that to achieve the best results each mind must progress somewhat after the same fashion, is continually proved by the marked success of self-made men."

As indicated in connection with the discussion of the text-book method, there is abundant room for improvement in the application of this law.

[1] Herbert Spencer, Chapter II, in "Education."

V. *The law of absorption and reflection* was briefly discussed in the latter part of Chapter VI. According to it, absorption in details and reflection in regard to them, regularly alternate in effective thinking. Herbart's own words are as follows:[1] —

"Absorption and reflection, like a mental breathing, should continually alternate with each other. Absorption takes place when ideas are brought to consciousness one after another with proper clearness and accuracy; reflection takes place when they are collected and combined. The more fully and carefully these operations are provided for, the more effective proves the instruction."

Any good instructor unconsciously applies this law when he stops to summarize and take a bird's-eye view of ground covered, ranking the facts according to their relative worth.

VI. In Chapter VI the importance of physical action, or *motor activity*, was urged, and it was practically declared to be a law that ideas must find expression, must be realized in action, before they can be conceived with the greatest clearness and accuracy. The kindergarten, especially, has always stood for this thought; in its plan of study more time each day is devoted to carrying out ideas into action than to the presentation of the ideas themselves — a practice that has been by no means characteristic of instruction above the kindergarten. But in recent years several

[1] Herbart, "Paedagogische Schriften," I, p. 417.

distinguished psychologists and educators have declared themselves in favor of accepting this statement as a law, and its marked influence on education in the near future seems certain.

VII–VIII. Other possible laws have been occasionally referred to in the preceding pages, but they are not here enumerated, either because of some doubt as to their universality, or because they are commonly thought of as affecting rather the selection and arrangement of subject-matter in studies than its method of presentation in the class room. Two of these are known as the *laws of interest and of correlation.* According to the former a deep interest must be aroused in thoughts before they can exert the strongest influence upon mental life and character; according to the latter, the ultimate value of facts depends as well upon the number and closeness of relations into which they enter as upon the clearness and accuracy with which they are conceived.

The law of interest expresses one great condition of effective instruction; it makes a demand that the teaching accomplish a certain end, but does not itself give any hint as to how this end can be attained. It affects first of all the selection of subject-matter, but furnishes a daily test of method as well, by requiring that there be a healthy stimulation of the emotions as well as of the intellect in all instruction. The law of correlation was involved in the insistence (in Chapter VI) upon a close sequence in the facts of a lesson, in the demand that they be arranged in a series or network, and that even the teacher's questions reveal a close connection.

Both of these laws, therefore, have a direct influence upon method, although not limited to that field.

Undoubtedly there are other laws of teaching besides the eight that are here mentioned, but these are at least some of the broadest and most important. The law of apperception alone includes and interprets most of the so-called principles of teaching that have often been mentioned in times past; for example, from the near to the remote; from the simple to the complex; from the easy to the difficult; from the whole to the parts. These sayings are sometimes true, sometimes not. The law of apperception is deeper than they and shows where they are applicable.

These eight laws should be guides to the teacher in the fullest sense. It would scarcely be possible to conduct a single thirty-minute recitation without applying all of them several times, with the possible exception of the law of induction.

Thus we see a most intimate connection between theory and practice when skilful instruction is imparted. The fact that these are general laws and not specific devices prevents them from cramping the teacher's freedom and individuality, for a general law is always capable of infinite variety in application.

To the extent that laws of instruction are developed and brought into a system, there is a science of method; consequently these eight laws being as deep and broad as they are, and being intimately related to one another, furnish a fair basis for the assertion that there is a scientific method of teaching.

CHAPTER XIII

APPLICATIONS AND CRITICISMS

THE *relation of the Formal Steps to text-books* is important, for our text-books are a fair index of our methods of class-room work, and the standard set up and generally recognized as attainable is that of the better class of such books. So indispensable are they in our prevailing methods of instruction that any plan which ignores them will be regarded as visionary. It is, therefore, quite important to see clearly the relation of the formal steps to the use of text-books.

Value of text-books.

First let us see the chief utility of these books. They indicate what knowledge is regarded of most value to children, in what order and connection it should be studied, and in a broad, yet definite way the method by which it shall be acquired. The value of text-books lies in their helpfulness to teachers and pupils Containing, as they often do, the results of ripest experience in able teachers, they embody such a selection and arrangement of leading topics, such a correct statement of truths as every teacher needs. They give to both instructor and pupil that systematic body of thought which forms the framework of each study. As the text-books, like arithmetic, are worked out by different teachers, gradually a consensus of opinion settles upon a definite body of knowledge, which becomes the recognized standard in that subject.

The advantage of such well-established, authoritative text-books is seen, by contrast, in the absence of such standards. When the teacher has no such text-book, and no well-arranged body of knowledge of his own to take the place of it, he has no coherent method of procedure, and the work is a failure.

Moreover, text-books are regarded not only as an indispensable help and guide for teachers, but also as the chief instrument by which pupils can be brought to their tasks, to the mastery of their own difficulties. For seat-work and for home-study the text-books are indispensable. In the life of most pupils the text-books play an important rôle. In the schools as they are, it is largely the business of teachers to assign lessons and to hear them recited, and of pupils to learn lessons and reproduce them. So universal is this dependence upon text-books that most of our teachers would be at a loss to know what to do without them. A very important fact to be remembered is that most of our teachers have had no special preparation for teaching.

The text-books are essentially deductive and dogmatic in presenting truth; the five formal steps are expressly inductive. The distinction between these two methods is not absolute, but relative, for text-books commonly have a sprinkling of inductive processes, while the formal steps at one point (the fifth step) lay great stress upon deductive thinking.

Moreover, the inductive method of acquiring knowledge is one that cannot be reduced easily to text-book form. We have, indeed, text-books in Latin, history, and language, which assume to follow an inductive process, yet it is a method which, while it can be illustrated, cannot be fully carried out in a text-book. Such a method worked out in full would make our text-books as big as dictionaries, and so the teacher, in most topics, must be left largely to his own resources in working it out. The Socratic Dialogues of Plato, with their elaborate inductions, are examples of the detail with which a single truth is worked out. But the inductive method requires relatively few such elaborately treated subjects. It assumes that the teacher has originality and thinking power, and is not simply an instructor by rote or by imitation.

It is, therefore, in the first, second, and third steps that the inductive treatment of topics is clearly distinguished from the usual dogmatic form of our text-books. In detail these characteristics of the inductive method may be briefly stated as follows: —

1. It sifts out, brings together, and focusses upon the new topic those familiar experiences of the children which have significant relations to that topic.

2. It lays greater stress upon the clear and even graphic presentation of the concrete facts. It not only enlarges the descriptive detail upon any given object, but it multiplies examples of the same truth before leaping forward to general conclusions. The teacher needs a much larger accumulation of concrete data than the book supplies, and a definite skill in handling it.

3. The pupils are called upon to do more thinking, to trace out and explain causal relations, to raise questions themselves and interpret facts by their relations, as this larger material accumulates.

4. Definite comparisons are set up and the points of resemblance and difference, upon which laws and classifications are based, are clearly made out. The outcome of such comparisons is an index finger pointing toward a general truth. The text-books are chiefly blank on these pages. They, with overweening kindness, sum up the whole matter (often before there is much to be summed up in the minds of the children) and give the final result, but do not point out the long route travelled over to attain the result.

5. The stimulus which keeps the children alert in this self-active thought movement is the aim set up, the question, whose answer is eagerly sought by the children. Every lesson should work toward the solution of some definite problem, and the concrete data are collected and examined for the purpose of finding this solution.

The entire inductive process, with its pursuit of clear aims and movement toward general truths, suggests the notion of large lesson units, which are important enough to deserve a liberal treatment through all the essential steps of instruction. Here we are compelled to register a second strong contrast of the formal steps, as a method of instruction, to the method of the usual text-books.

The subject-matter of each study, viewed from the standpoint of the formal steps, should consist of *large lesson units* or groupings of facts, in each of which groups some single idea dominates. This idea or central truth (embodied at first in some particular or concrete form) is to be worked out in a lesson unity to completeness and seen in sufficient variety of cases to warrant a general statement. In the discussion of types, we found striking illustrations of the collection of facts and of the centring of thought around a few of these important truths. In the text-books the general truths involved in these lesson unities are present, but their superior worth and rank are obscured in several ways. Side by side with them stand a multitude of other facts or truths of far less real value, but apparently of equal rank. These important truths of the subject stand disguised as common soldiers when they ought to be uniformed as officers and moving at the head of whole battalions. In other words, the text-books distribute their force nearly equally over a very large area of facts and truths without much regard to perspective or relative value of the facts presented, not centring sufficiently upon the more important ideas.

The formal steps call for the exhaustive inductive treatment of a few important truths in any study. This inductive process of the five steps is far too elaborate a piece of method machinery with which to attack the multitude of truths, little and big, with which our text-books are crowded. If our wheat-fields were fenced off into a multitude of quarter-acre lots, it would hardly pay to apply the elaborate machinery of a reaper and self-binder to each one. The fields should be large enough to make the use of that kind of machinery most efficient; and so in the studies.

Having observed these points of contrast the practical question is this: *Can text-book methods of instruction be improved by modifying them in conformity to the principles of the formal steps?* The answer is that they can be so improved. In reviewing the situation as stated above, we find that the primary difficulty, for which no single teacher is responsible, is the fact that the subject-matter is not arranged into suitable lesson unities. The number of topics is too great to admit of proper treatment. But for the thoughtful teacher there is a remedy for these faults which still admits of a liberal use of the text-books. The teacher needs to survey the text-book material judiciously, cull out the more important truths that deserve full treatment, and bring the secondary and minor facts into relation to these central points. If necessary, omit some of the less important topics and thus gain time to collect, from other sources, the concrete examples needed for developing the leading general truths. One of the most important conclusions from our entire discussion is that any topic to be worked over by the formal steps must be important and typical enough to receive a full treatment leading up to the unfolding and application of a general truth.

In any case a clear grasp of the simple principles of the formal steps cannot fail to show the teacher how to put new life into text-book material. Any teacher who constantly draws from the children's home experience, from his own reading and larger observation, who sets up clear aims in the class room, and encourages children to the thoughtful working out of their own problems, is working both inductively and deductively.

It is evident from the entire discussion that any sudden revolution of our methods of teaching by introducing systematically the principles of the inductive-deductive process is not looked for. It is a labor of educating teachers out of traditional into rational methods. Wherever teachers in training classes, in normal schools and in teachers' colleges, in institutes, and in any meetings for careful discussion, are searching for the simple elements of method, the inductive process of developing general truths and applying them will give them a clear insight into the fundamental law of good instruction.

From the pupil's standpoint this sets up everywhere the problem of self-realization. What he needs is a chance to think and apply the truths which make up the usual text-book, an opportunity to develop and organize them into a body of related knowledge. This is, in fact, exactly what is accomplished in classes where a skilful teacher works inductively. The summaries and conclusions arrived at in class instruction, all systematically entered in the student's note-book, become a skeleton outline of the subject similar to that of a text-book.

Text-books are always in place when used to review and summarize ideas that have been well developed in instruction.

The text-book is also indispensable as an outline of the subject taught. The children need such an outline, not only for the purpose of guiding them into definite and systematic courses, but also to help out the irregularities of school work. Pupils who are absent often need such a text-book to find out the work accomplished and as a means of recovering the ground lost.

Are these laws flexible enough?

In trying to lay down uniform principles of method the question naturally arises whether there can be one method flexible enough to apply to all studies and to children of different ages. Teachers are prone to think that such a single method must produce a dull uniformity in the treatment of all studies. On the contrary, we claim that the laws of teaching embodied in the formal steps lead naturally to a great variety in the recitation work in different studies. Perhaps the chief reason for this is found in the diversity of general truths or laws worked out in arithmetic, history, geography, etc., and in the wide variety of concrete materials out of which these truths are developed. An examination of the processes of treating these contrasted topics in different studies will show how great is the variety in method coupled with uniformity in fundamental principles.

In geography for example, in such topics as Minneapolis as a trade centre, irrigation in the West, a coal mine, the Rhine River, cotton raising in the South, etc., the chief burden of work is met in the first and second steps, where each topic is fully discussed and reproduced by the children. On the other hand, the general truth which is developed in the third and fourth steps can be derived quickly, requiring only a small portion, relatively, of the recitation time. The fifth step may be briefly handled or brought in by comparison in discussing later topics.

This emphasis of the second step in geography calls for a definite kind of knowledge and skill. The teacher must know the full concrete details of his subject and be able to present them in a graphic way. In primary, intermediate, and even in grammar grades this abundance of interesting material is peculiarly appropriate to the mental condition of the children and brings into full action the senses and the imagination.

What has just been said of geography is largely true of history. In the history lessons of intermediate and grammar grades there is great need for fulness of biographical particulars and much dramatic and picturesque narrative. In contrast with this requirement our text-books are filled up with general statements, important enough in themselves, but not understood for lack of background and detail coloring. In history, therefore, as in geography, the formal steps point out the exact spot where the greatest improvement is now called for; namely, in the largely increasing amount of personal, individual, narrative material, which should be introduced to give keener relish and clearer understanding of historical or geographical truths. For younger children in their first approaches to history, simple and interesting biographies are strikingly suited. The reasonableness of this demand for historical biographies is so generally felt that many of the recent books introductory to history have made this idea the basis of their treatment.

In history the time given to comparisons and to the formal statement of general truths is relatively brief, as in geography. This is illustrated in the lessons on King's Mountain, In Unity is Strength, The Settlement at Plymouth, Burgoyne's Invasion, The Invention of the Cotton Gin, etc. Indeed, it may be said that any geographical or historical topic which has been fully worked over in the first and second steps will lead up quickly to a clear understanding of important general truths. No great amount of time, then, need be spent on the third or fourth steps.

A third study which may be classed with those just mentioned is natural science. In this, also, the first and second steps largely predominate and absorb most of the recitation time. Here, again, the general truths arrived at in the third and fourth steps may be briefly stated. But the process of treating a science topic in the first and second steps is quite distinct from that in geography and history. In natural science lessons the children are in the presence of the objects of study, and must learn to observe and scrutinize the facts. The skill required of the teacher is not that of graphic description or narrative, but that of guiding the children to a close observation, description, and inference. This is illustrated by the lessons on the milkweed butterfly, where the children observe the outdoor life of butterflies, collect specimens, examine, compare, and draw conclusions as to butterfly life.

These three studies, therefore, — natural science, geography, and history, — while they agree in giving a strong emphasis to the second step, present a striking variety in the method of treatment suited to the peculiar materials of each study. They harmonize also in abbreviating the third, fourth, and fifth steps; and yet the general truths formulated and applied in the fourth and fifth steps are so widely divergent that a free inventiveness and originality on the teacher's part are always appropriate. The formal steps lay no clamp upon the teacher.

In arithmetic our present methods of teaching place great emphasis upon the fourth and fifth steps, *i.e.* upon the statement and application of rules. Generally speaking, neither text-books nor teachers spend much time in the inductive solution of problems before stating the rule. Perhaps nine-tenths of the time of arithmetic recitations is consumed in learning and applying the rules. In arithmetic we have, therefore, in present practice, the exact opposite of what we have described in geography, history, and natural science, and this is, in the main, defensible. Even in the proper teaching of arithmetic by inductive methods a much greater amount of time will be spent on the fourth and fifth steps than on the first and second. Our present practice in arithmetic neglects the inductive approaches to rules, as every experienced teacher knows. The formal steps call attention to the importance of inductive processes in working up to arithmetical rules.

In the study of formal grammar in the seventh and eighth grades there is also a preponderance of the fourth and fifth steps. The amount of language material already collected in the experience of the children makes it possible to devote the major part of the pupil's time not to the acquisition of new individual facts in language, but to the collection and comparison of familiar facts, to the formulation of general truths and their application. In developing any language principle in the first and second steps it is necessary to bring together familiar language material, but there is no need for description or narrative such as is found in geography and history.

Moreover, in both arithmetic and grammar we are able to work out a somewhat complete and systematic body of thought before completing the grammar school. But in geography, history, and natural science no such complete system is possible. As remarked above, it is necessary in these studies to collect a large body of new and concrete data, and in this lies a large part of the labor and interest of the study. The general truths reached, while extremely important, are not so numerous nor so complete and systematic in statement and arrangement as in arithmetic and grammar. The fact that the definitions and rules of grammar and arithmetic can be definitely developed out of particular data, and formulated in logical statements which can then be applied, makes the treatment of topics in these studies (arithmetic and grammar) almost perfect illustrations of the inductive-deductive method of instruction.

In reading lessons a close analysis is necessary to show the definite application of the formal steps. Reading has two phases. On the one side is learning how to read, first by mastering the symbols in primary grades, and second by drill in easy, natural oral expression in all the grades. On the other hand, reading means learning to appreciate and interpret the thought content of the lessons, the ideas, experiences, and truths embodied in the best reading matter. In short, reading may signify a mastery of symbols or a study of literature.

The body of knowledge to be acquired in learning how to read appears unsystematic and must be carefully sifted out by the teacher to get at the essential ideas. The work consists largely of learning a set of symbols and word forms and of associating with them the already familiar forms of oral language. It includes also the physical development and exercise of the vocal organs. One of the chief causes of poor reading is that teachers do not sift out the essential ideas in this somewhat miscellaneous body of exercises. While the general truths involved are somewhat fugitive and difficult of formulation, they should be as definitely grasped and stated as possible.

There are certain rules for the spelling and pronunciation of words, for the distinct articulation of vowels and final consonants, for acquiring natural, conversational tones, for the expression of different feelings and emotions, for emphasis and apt expression of thought.

Such general directions do not cover the whole ground, but they indicate what sort of definiteness should characterize the teacher's effort. They may be worked out inductively and applied in the class room. In order to show that the art of reading involves principles, it is only necessary to ask, What is the teacher's chief purpose in any given lesson? *e.g.* distinct articulation or natural expression. If she has no such distinct purpose, her work, lacking aim, will be loose and indefinite, and specific progress will not be made.

Looked at from the standpoint of the thought and culture material supplied in reading, there are many truths, historical, scientific, and social, which ought to be worked out in reading lessons. Illustrations of this embodiment of truths may be found in "The Vision of Sir Launfal," "The Great Stone Face," "The Psalm of Life," and "Evangeline."

Reading, in both its phases, greatly emphasizes the step of application. It is one of the most directly useful of all studies, first because the ability to read is applied so constantly in most kinds of instruction; and second, because the reading of good books supplies one with the best outfit of social and culture ideals. The fifth step, therefore, in all reading exercises, is doubly important. To apply thoroughly the few rules and principles of oral reading is essential to good work, and bringing to bear the social ideals derived from reading upon the behavior and upon all the social life of the school is vitally important. The demand for graphic, concrete illustrations in the second step, and for the apperceptive use of familiar experiences in the first step is strongly felt in all good reading work.

In this brief survey of the school studies we observe that the formal steps are capable of great variety of adjustment to the peculiar subject-matter and needs of different studies. The widely divergent character of the general truths developed, and the still more divergent subject-matter from which they are drawn, are a complete test of the flexibility of any proposed principles of instruction. We find that these simple principles of induction and deduction possess adequate elasticity. They are not a dull, mechanical device for reducing all studies to a uniform method. On the contrary, they not only allow, but require, great flexibility and originality in the teacher. At the same time, there is a fundamental movement, which is the same in all the studies and is the basis of scientific method. But the point to be emphasized is that these principles not only lay requirements upon the teacher, but they are a great help to her; they define the course so clearly, in a large way, as to be encouraging and inspiring. They bring definiteness into the field of teaching, where without them one is lost. They are indispensable as a guide to young teachers, and a strong corrective of poor methods in experienced ones.

Looking abroad, beyond the range of common school studies, we may find in the kindergarten, in the high school and university, in Sunday-school and pulpit, many places which will still further test the flexibility of this method of instruction in its application to the needs of education.

In this chapter we have considered mainly the varying application of the inductive and deductive processes to text-books and to the different studies. But the formal steps also involve other principles of very great importance. Closely linked with the inductive and deductive processes are the principles of apperception, of interest, of self-activity, of logical sequence in thinking, of aim-setting, of the selection of types and lesson unities. All these are involved in the application of the formal steps to each of the branches of study. We may say, in brief, that the inductive-deductive thought movement furnishes the opportunity for every one of these principles to be put into efficient operation. When properly arranged and adjusted to one another, these principles are not antagonistic, but work in harmony. The principle of apperception, for instance, applies to every lesson unity, no matter in what study, and the formal steps make definite provision for the exercise of this principle in each important topic studied. The other principles may be tested in the same way, in each study.

Before any such plan of selecting and of treating topics can be generally accepted, it should be grounded in psychology and its worth practically demonstrated to the satisfaction of teachers in a large variety of studies. Our present educational practice is based upon traditions and theories which partly support and partly antagonize the principles of the formal steps. We can well afford to examine and test them from both standpoints.

Criticisms of this plan.

Any well-matured plan based upon psychology and sound theory ought to be an ideal which our practice has only partially attained. Many of the best criticisms, therefore, will be found to be simply practical difficulties which inevitably arise in every effort to gain greater proficiency and skill.

The first criticism, which the friends as well as the opponents of any plan of instruction must seriously consider, is found in the query, "*Is it scientific?*" This question we have attempted to discuss at length in the earlier chapters. The psychology of the individual and general notion, of percept and concept, was laid down in the earlier chapters as the scientific basis of the inductive movement in learning. If there is any one process in mental life upon which the psychologists, as scientific thinkers, are agreed, we take it to be this normal movement of the mind from particular to general, from percept to concept. Moreover, the great educational writers, some of them psychologists of the first rank, as Comenius, Locke, Rousseau, Pestalozzi, and Spencer, have given an overwhelming emphasis to this one idea.

It seems improbable that teachers will object to any of the fundamental principles, considered singly, such as sense perception, beginning with the individual and concrete, self-activity in acquiring and in using ideas, apperception, the inductive movement from particulars to generals through close observation and comparison, clear formulation and memorizing of the general truth, the deductive extension of truth acquired to new particulars, repeated applications till proficiency in common use is gained. But there is a further question, whether we have rightly estimated these various principles according to their relative value, and have found out what are their true sequence and interdependence. This organization of essential principles into a compact plan, flexible enough to be applied to different studies, may well be subjected to close criticism. Even if such a plan is adapted to geography and history, has it equal value for mathematics, reading, and Latin?

In this critical discussion it is not difficult to keep in mind the three principal stages in the mental movement upon which the formal steps are based: (1) perception, or getting the knowledge of the individual; (2) the inductive process up to the clear statement of the general truth; (3) deduction, or the varied application of the truth to new data. Just to the extent to which we find this movement in learning to be general or universal, we have a scientific basis for method in instruction.

Natural reaction against law.

But we naturally resist the proposition to bind ourselves down to any law of instruction. So strong is the *instinct toward individual freedom* that we will submit to no law unless it is very clear and very imperative. Instead of finding this general law accepted, we shall be met with the unfailing criticism that we are drifting into a hard and close routine. This criticism is based upon the assumption that the teacher is trying to make an artificial mould in which mental action is to run, rather than that the nature and constitution of the mind itself determine its mode of activity. The main question goes back to the previous query, Have we found the natural process? All will agree that the teacher cannot arbitrarily make the process, he can only help to guide the minds of children along the road of their best natural free expression.

We have a right to resist any arbitrary effort to impose upon us an artificial, dogmatic law of instruction. But having rationally and experimentally worked our way to an understanding of the simple principles of teaching, it is true wisdom and self-mastery to constrain ourselves in practice to conform to them.

The freedom of the teacher consists not in disregarding the law, but in finding it out and obeying it.

If psychologists and teachers have been so fortunate as to find the natural highways of human thought, all this crying out against mechanism and formalism is only so much railing at the laws of nature. The whole question of freedom and originality in the teacher may be one of obeying the laws of nature, or of constantly blundering in the effort to be free and original. The teacher must have either an instinctive tact or a conscious insight into the simple laws of mental life and action, or this much-lauded freedom and originality is entirely eccentric and unreliable. That teacher will possess the greatest freedom, versatility, and power in instruction who is most skilful in obeying the law which regulates the child's thinking. We are constantly driven back, therefore, to the fundamental question: Are we mistaken in our interpretation of the mental movement in children? Have we wisely applied the principles of psychology to method in teaching?

But even if our principles are correct and our interpretation of this general process well grounded, we are still exposed to the danger of countenancing a *dull routine*. The formal steps, like any other plan of recitation work, may be reduced to a mechanical form, destitute of life. There is no protection against this kind of routine except in spirited and earnest teachers. A well-grounded process in teaching will not save the teacher who lacks knowledge of his subject, who lacks insight and tact in managing children, or who is destitute of spirit and originality. In other words, the teacher must throw the whole strength of his personality into those channels which a wise method has laid out, or else failure is sure. We can easily expect too much from formal principles and plans of instruction. They are valuable as a means of economizing and of concentrating the teacher's energies within the best channels. The tacit assumption always is that a teacher pours his own versatile and vigorous spirit through these channels. Without this the form of instruction is like a dry mill-race. It may be admitted that an active-minded, independent teacher may feel hampered, for a time, in the attempt to apply the formal steps of instruction. But just as a young pianist gradually overcomes awkwardness and self-consciousness in following the directions dictated by the principles of music, so the teacher can expect to free himself gradually from the feeling of constraint, and in the easy use of these principles find a means of power.

Another criticism against the method of instruction under discussion is that *it increases the load of the teacher*, while *it reduces the amount of independent effort required of the pupil.* This criticism, if true, strikes a fatal blow at the whole plan. There is, indeed, an appearance of justice in this criticism. The teacher is required to show greater skill in presenting topics (in the second step), more power to illustrate and explain, more insight and tact in calling out the experience and older knowledge of children (first and second steps), greater precision and aptness in questioning and in developing general truths (in second, third, and fourth steps), a more complete logical mastery of the principles of the subject taught, and their various applications. All these things are necessary to first-class teaching, and where the teacher has not yet acquired this sort of professional knowledge and skill, these requirements are indeed a burden.

But most persons will acknowledge that these requirements are just. The teacher must assume the obligation of a larger mastery of his subject and of a readier proficiency in class-room treatment. In this we are simply setting up a standard to which teachers are encouraged to rise, and which lays upon them the burden of professional equipment.

But there is another side to this difficulty. That which at first glance seems only a heavy burden becomes later an inspiration and easement. Having once acquired professional knowledge and skill, the teacher will find his work becoming less mechanical and burdensome, more spirited and engrossing. The feeling of conscious power, based on previous success, becomes an exhilaration, and the teacher moves up to a larger freedom and capacity for instruction. Instead of the cramping influence of a narrow routine, he feels the expansive energy of a clear and generous purpose working in practical ways. The criticism against this so-called overburdening of the teacher loses its point when we consider that the outcome of a mastery of these principles of teaching and of their skilful use means economy of effort and the inspiration of success.

But the more important question is, *What effect has this method upon children;* does it make thinkers and workers, or does it produce lassitude and easy-going habits of study?

It is sometimes supposed that the more skilful and efficient the teacher and the method, the less the pupils have to do. Just as if we had forgotten the underlying purpose of all study, to produce the greatest vigor of *self-activity* in the pupils. The essence of all good teaching is to stimulate thoughtfulness and self-effort in the pupil. Even where the teacher in the second step presents or illustrates topics, his purpose is to awaken thought and to secure close attention, and to increase the labor of the pupil.

Whatever is thus presented by the teacher must be appropriated and reproduced by the pupil. Much greater vigor of attention and effort can be secured under the eye of the strong teacher in the recitation than in isolated seat-work where the pupil may dawdle as much as he pleases.

The recitation itself is one of the best places in which children can be trained into habits of keen and close attention. But so far as possible the habit there formed should be strengthened by similar exertions in seat-work and in home-study. The main question is, Where and how can the teacher bring his personality to bear upon a child in such a way as to induce strong and vigorous mental action? Our answer is that it depends upon the manner in which the teacher handles his subjects in the class room. If he knows how to interest and intensify intellectual and will power in the recitation, the seat-work and the home-study will fall into line. In other words, it is a question of method in the recitation.

Some children will probably learn how to concentrate their powers if left to themselves with books, but most pupils need the presence of the vigorous and incisive teacher to give them their tempo in intellectual action.

Equally important with this habit of concentrating attention is the ability *to think logically and independently*. We want self-reliant thinkers. The Socratic method of discussion, while very difficult, is the only one that can lead to this result.

Throughout the general inductive process (first, second, third, and fourth steps) a careful scrutiny will show that a child is constantly thrown back upon his own resources in observation (sense perception), in the resort to home experience and previous knowledge (apperception), in the careful statement (reproduction) of all facts observed or presented in the class, in making comparisons, and in the statement of general truths which are formulated by the children themselves. The underlying purpose of all this work is to arouse vigor of thought and self-exertion on the part of the pupils.

It is an extremely superficial and perverted view of this process therefore to call it a method of making study merely easy, entertaining, and non-laborious to children. Mental effort should always be tense, not loose and flabby. It requires skilful teaching under any circumstances to produce this kind of sturdy, self-reliant effort. But we shall certainly not solve the problem by allowing the teacher to abdicate his position and his duty as a skilful leader in the class room and to roll the whole burden and responsibility upon the pupil by saying that he must learn the entire lesson before he comes to the class.

The teacher is more than a simple taskmaster, and his function as a taskmaster should remain in the background till other and better means of stimulus fail.

It is the business of the teacher to economize effort for the children as well as for himself; to get at truth by the shortest route, along the line of least resistance. We need not be frightened by such a statement. There will be plenty of difficulties to call out their powers, numberless tasks in which they can work out their own salvation. One of the great problems in the use of coal and electricity is to reduce the waste, to economize by utilizing the highest percentage of power. So in mental operations.

There is a great folly in wasting a child's effort upon some problem which he is not ready for, when the teaching has been so blundering as to bring him against a difficulty he is not prepared to meet. One reason why we have to help children so much is because of our unnatural methods of bringing them unprepared into difficulties. If we lead children along according to the natural law of thought, they will solve their own difficulties, become independent thinkers. If we ignore the laws of teaching, we have to step in frequently to extricate them from their difficulties. Ease of movement is a good thing. If all our school work is encumbered with the heavy drag of toilsome effort, *i.e.* of effort put forth merely to overcome needless friction, it becomes terribly depressing.

One of the most serious obstacles in the way of introducing such a class-room method as we have proposed (including spirited oral work, presentation of topics by the teacher, and a Socratic mode of question, answer, and statement by children), is the fatal tendency, with many teachers, of allowing this process to degenerate into a waste of time, an aimless wandering and inadequate treatment of topics. The awkward and abortive *development lessons* too often observed, may easily lead us into a condemnation of inductive methods of teaching.

The old-fashioned text-book work, in which children learn their lessons and recite them, is far better than this so-called development work. But there is something better than the old verbatim recitation, and it involves the higher power of skilful oral discussion of topics in the recitation. The fact that so many of us are clumsy in teaching inductively is no sufficient reason why we should not set up for professional at tainment that method which has most highly recommended itself to the good sense of the best thinkers and teachers. We have many teachers to-day, especially in primary and intermediate grades, who are so expert in the oral treatment of topics that they could not be induced to return to a duller method. All the great writers on education, Comenius, Locke, Pestalozzi, Spencer, and Mann, have condemned the purely deductive method of imparting general truths dogmatically in elementary schools. In all schools and institutes, therefore, where teachers are in training, it is needful that inductive methods of study be cultivated, illustrated, and applied.

Still another criticism has been raised, on the ground that the inductive methods of teaching do not lead to such a *thoroughness and mastery of the subjects* as deductive teaching and formal drills. One of the strong points in the education of the past, which has been chiefly deductive, was the thoroughness of its discipline by drills and repetitions. At least such has been the firm conviction of its friends. It is incumbent upon the inductive processes of teaching to show a superior kind of thoroughness, not only that looseness and shallowness are not the necessary fruitage of inductive methods, but that a thoughtfulness, a careful assimilation of knowledge, an organic building-up of thought-masses, results, which gives the best sort of thoroughness and mastery of studies.

In schools where the formal steps have been systematically worked out and applied, such thoroughness has been one of the main results aimed at. It shows itself especially in the power to use what has been learned. In Chapter VII, where the acquisition of particular notions is treated, and in the chapter on the Application of General Notions, there was an unusual and varied emphasis of this perfect mastery. In addition to this we may evidence the fact that in closing up the work of the second and fourth steps, careful and thorough reproductions and drills are held to be an essential part of this plan of teaching. At these two stations we can afford to stop and summarize the results of study. These are the two points where a thorough knowledge of the individual notions (second step) and general notions (fourth step) is rendered indispensable. Careful repetitions and drills and systematic ordering of facts and principles are insured first by oral exercises in the class, and secondly by clear and logical outlines and full written statement of principles and rules, in a blank book carefully kept or in the text-book form.

But in addition to these important stations on the recitation road specifically devoted to careful fixing of ideas, there are two other places in which the final complete mastery of knowledge is tested; namely, in the apperceptive use to which all our resources of knowledge and experience are put in the first step, and in the applications which are so completely worked out in the fifth step.

The greatest difficulty which lies in the way of a psychological procedure in teaching, which is adapted to the needs of the children and to the material treated, is the whole traditional method of instruction now in vogue. No one teacher or group of teachers is responsible for this. The plan which commonly prevails of allowing children to prepare their lessons at their seats, and come to the recitation to recite, the prominence of the text-book with its brief statement of facts and principles and the rigid dependence of teacher and pupils upon it, the emphasis put upon testing and examining by teachers — all these things are matters of long-established custom, and are firmly rooted in the habits and convictions of our teachers of all grades of excellence. The plan of recitation which we propose runs counter, in important points, to these traditional methods. It calls for much greater mastery of the subject taught, a closer acquaintance with the children's experience, greater skill in instructing, and more shrewdness and ability in throwing the children upon their own resources and self-activity. It is a plan for developing greater tact, originality, and expert skill in every phase of instruction. For this reason it cannot be accepted at once by all teachers. It calls for too great a change from routine methods to methods based on clear insight and skilfully applied.

A misconception that needs to be carefully guarded against is that every recitation should show the full treatment of a topic through the series of five steps. On the contrary, it is seldom that a single recitation will reveal the treatment of a subject in this complete series. Frequently it requires one or several recitations to handle merely the second step of a lesson unity. Sometimes the application of a principle (fifth step) will require the whole recitation period or more. The unit of instruction is not the time of a single recitation, but the central truth to be worked out and applied in a lesson unity.

Another misconception is that any given method whole (or lesson unity) must be worked out completely through the five steps before another method whole is taken up. On the contrary, it will often happen that one method unit will be carried through the first and second steps, and then dropped for a while, other unities being treated in the interval. Later on new examples or data illustrating the first unity come up for treatment, and comparisons are made with the earlier lesson unit, which lead on to the statement of a general truth and its further application.

If, for example, the children have studied the upper Mississippi as a lumber stream, other topics, as the Great Lakes, the Ohio Valley, Niagara Falls, etc., intervening, they will later come upon the lumber streams of Maine, and make comparisons with the upper Mississippi as to the mode of collecting and distributing lumber, and draw a larger general truth from it than was possible with the Mississippi alone.

In history, likewise, the children have studied the battle of Bennington long before they read of the battle of King's Mountain. Many other topics have come in between these two events. But when King's Mountain has been described, it is a fitting time to make the comparison with the battle of Bennington (third step), and lead on to a statement of that common spirit which animated the patriots in both these battles (fourth step), while still later conflicts of the Revolution and of the Civil War may furnish the best applications of the same idea (fifth step).

This conception of the free use of the formal steps, according to the necessities of the study, and of the particular topic under treatment, puts the teacher under no narrow compulsion and removes the necessity for cramping any lesson into an artificial method scheme.

CHAPTER XIV

LESSON PLANS

The preceding text demands that every progressive teacher carefully prepare for the teaching of any topic. This requirement necessitates lesson plans of some sort. These should be written out in detail by the inexperienced teacher, as often as time and strength permit. It makes comparatively little difference, with the experienced teacher, whether they be written out or only thought out, provided a well-digested plan is in her mind before instruction begins. The best assurance, however, that a plan has been properly digested, is its existence on paper in proper form. Following are suggestions as to the principal features desirable in such a plan.

(Full text of poem "Excelsior" at this point.)

PLAN FOR TEACHING "EXCELSIOR"

Age of pupils, 12–13 years (6th year of school).

Teacher's principal Aims --

a. Enjoyment of a well-known poem, hence increased love of literature.

b. Appreciation of a certain moral idea, *i.e.* a lofty aim with unhesitating pursuit of same.

SUBJECT-MATTER	METHOD OF PRESENTATION
	Pupils' Aim — To learn what became of a young man who attempted to climb the Alps.
	Describe a lofty mountain. What are some of the dangers one might expect to meet in climbing it? How do the monks come to the aid of mountain climbers?
Simple narrative taken literally. Meaning of difficult words and phrases.	Read the poem, stanza by stanza.
Leading facts in literal story.	What is meant by device, falchion, clarion, spectral glacier, awful avalanche, startled air?
	Read the poem through carefully a second time. Describe the region. Tell the story.
	Was the young man joyous or sad? Read answer in words of author. (vv. 2, 3, 5.) Was he attractive or unattractive in appearance? (vv. 2, 5, 9.)
Interpretation.	What things tempted him to abandon his journey? (vv. 3, 4, 5, 6.)
	Did he stop? What became of him?
	Do you see any good reason why he should not have stopped? Was he, then, a foolish fellow or a rash adventurer?

SUBJECT-MATTER	METHOD OF PRESENTATION
Longfellow calls the young man "beautiful," and in last two lines suggests his ascent to heaven. Story figurative.	What is Longfellow's opinion of him in the last verse? How explain such approval?
The mountain signifies a steep road, the route necessary for an unselfish life. The happy homes and the three persons signify types of temptation, or of overcautious advisers.	Since the story is not to be taken literally, let us see how it should be interpreted. What does the mountain signify? The happy homes? The old man? The maiden? The peasant? Why is the device spoken of as strange? The tongue, as unknown? Meaning of excelsior?
Striking qualities of the young man are unselfishness, courage, determination, energy.	What are the striking qualities of the young man? How shown? How was a motto of value to him? Reason for frequent repetition of "Excelsior"? Describe in full the kind of person the author seems to admire. Have you ever known or heard of such persons: Washington, Lincoln? Other persons in history? in present time?
All efficient persons, with high ideals, must show these same qualities.	Do you think that it is necessary for every good person to exercise these same qualities? Proof?
	Does this poem encourage recklessness? Proof? At what times do we most need to

SUBJECT-MATTER	METHOD OF PRESENTATION
	recall it? What are the advantages of possessing a high ideal? How is it helpful to have a motto?
Style.	Find some happily chosen words.
Diction — beauty, force.	Which stanzas show the character of the youth most forcibly in your opinion? Which seem to you most attractive?
Good oral reading.	What precautions, if any, would you suggest for the proper reading of the poem aloud? Read it aloud.

1. The most apparent, and probably the most important characteristic of the above plan is the *complete separation of subject-matter from method*; the space on the left of a line drawn down the page is devoted *solely* to subject-matter, that on the right, *solely* to method.

The primary reason for this complete separation of two very different kinds of matter is that it is necessary, in preparing a good plan, to think through subject-matter independently of method, and, indeed, *before* method is considered. It is very common for teachers to begin determining their method of presenting a topic before making sure that they know the facts which are to be taught. And when subject-matter and method thus become mixed, teachers are not easily made conscious of their ignorance. Their method, too, is then seriously affected, for one reason for much bad method is that the facts to be taught have not been clearly conceived. These statements apply as much to grade work as to more advanced instruction. Students are urged, therefore, to make themselves masters of their subject-matter, to practise outlining it for that purpose, before seriously considering the manner of its presentation.

An additional reason for this clear separation in the plan is the fact that a critic teacher or other supervisor can see at a glance the instructor's outline of fact and of method.

2. The statements in the left-hand column are intended to constitute an outline of the facts to be presented, in *close sequence*, and to convey *full meaning* when read without reference to the right-hand column. The statements in the right-hand column are likewise intended to show the outline of method, in *close sequence*, and to carry *full meaning* when read without reference to the left-hand column.

But the matter on the two sides of the line are so placed on the page that the facts in the left will, so far as possible, have their method of presentation *directly opposite* to them on the right.

3. The outline of method consists of the *actually anticipated conversation*, in outline, between teacher and pupils. The principal questions and statements of the teacher, and the replies from children, — when the latter seem necessary, which is seldom the case, — therefore appear here in the form of *direct discourse*.

The reason for this requirement is seen in the fact that such a conversation must actually take place during the recitation period, and this is the nearest equivalent to the real thing — as a preparation. To be sure, one cannot with certainty foresee the turns that a conversation may take; but if he has thought through its most probable course with care, meanwhile considering its possible deviations, he is far more a master of the situation than otherwise, far more ready for the unexpected. A carefully considered plan is the means of securing freedom to follow any one of several courses; in other words, to adapt one's self to the needs of pupils.

This requirement applies more fully to "development lessons" than to recitations in which the time is occupied mainly with laboratory experiment; or translation; or written work at the desk or at the board; or construction, as in manual training, fine art, domestic science and domestic art, where the pupils' plan has already been completed and further help from the teacher is individual. It applies still less to the supervision of study hours, library readings, etc.

Nevertheless, a well-developed plan of procedure is desirable in all such cases, and there are always the two factors involved, namely, *subject-matter*, in the form of facts that are to be put before the pupils collectively or individually, and *method*, or the manner of presenting these facts. Usually, too, if a teacher is properly acquainted with his subject and his pupils, he can anticipate what points will need particular attention, in what respects they will cause difficulty, and how these difficulties may best be met. For example, an instructor in composition in the fourth year of the elementary school, or in the high school, should foresee important difficulties to be encountered by his class and the remedies; and this is true even though they be writing on various topics. Close sequence in the subject-matter of such a plan and in steps of method is likely to be wanting, to be sure, and possibly other characteristics here suggested; but conversation or directions will be called for, centring usually about certain few points, and to the extent that this is true, a plan is needed, approximating the form here presented.

4. Careful *paragraphing* of statements, questions, etc., with proper *indentation* to indicate *subordinate relationship*, is as necessary here as elsewhere. In fact, it is particularly important that persons preparing to teach, acquire the habit of grouping related thoughts and recognizing their relative subordination. Consequently this plan, both of subject-matter and method, attempts to indicate clearly, by the form on the page, what the chief topics are, and what matter is of minor importance. This is only a preparation for bringing the children to appreciate exactly the same kind of relationships, which is one of the important objects of instruction.

Teachers allowed to use the terms "preparation," "presentation," "application," etc., in their plans, have been found, very often, to paragraph on the basis of such headings. But these are psychological terms; they are not to be heard in actual recitation, and have little to do with the paragraphing of the thought from the point of view of the child. They are, therefore, omitted in this plan. If, however, they sometimes seem necessary for the better comprehension of the plan on the part of supervisors, they might be included, but enclosed in parentheses and given a subordinate place on the page.

5. Some exception to the spirit of the last remarks is made in the plan in regard to the *aim*. The outline of method includes, of course, the aim of the recitation as worded from the point of view of the children. But since the aim conceived from the teacher's point of view is usually very different from the children's aim, and since each should be very clearly apprehended and carefully worded, the two are here included, with their distinctive names.

6. Owing to the great emphasis laid by modern education on the arousing of interest through new and rich thought, there is a strong desire, especially among the more earnest teachers, for a constant advance in the instruction. On this account, at least partially, these teachers are prone to neglect *detailed reviews*, *summaries*, and *drills*. Yet these are matters of the highest importance; interest itself, in the long

run, demands much time for them. For, if they are overlooked, children soon lose the outline of the subject-matter; their attempts to use facts recently taught lead to failure, then discouragement and loss of interest follow.

It is important, therefore, that detailed reviews, summaries, and drills be included in the plans, being sometimes indicated by these terms in parentheses at the proper points, but, as a rule, by the exact words in which the teacher expects to call for such work. Much is involved in the last requirement. It is easy enough, of course, simply to ask some child to "review," or "summarize," certain matter, or to "repeat it over and over." But the pedagogical demand for live questions on the part of the teacher applies in full to calls for reviews, summaries, and drills. A progressive teacher will study to avoid the dead formula here, and require such work through thought-provoking questions and remarks. This is one of the points where a high degree of skill is possible and where improvement is greatly needed. The plan for "Excelsior" calls for a large amount of review and for summaries, as can be seen by examination of it. But the authors have tried to avoid "going out of their way" for such things. A large amount of review is really necessary in the proper advance of the thought itself, and this plan is an attempt to illustrate that fact.

7. The amount of *detail* necessary for a plan is

probably reasonably approximated in that here presented. Although very minor points are omitted, no large amount of writing is required. The subject-matter in this case, however, is contained in a poem; when it is not found in any particular text, the columns for subject-matter will naturally need to be fuller.

8. The teaching of "Excelsior" would probably occupy not less than three or four recitation periods, but the plan shows no *subdivisions* with reference to *particular lessons.* In our opinion, plans in general should be made out for a *whole topic* rather than for *certain lessons.*

The amount of ground that is likely to be covered in any one period may be omitted from consideration, or, if attention is given to it, the subdivision can best take place after the plan for the entire topic has otherwise been completed. The reason for these suggestions is that it has usually been found to be a serious interruption to one's train of thought to be compelled, when preparing a plan, to give attention to suitable (twenty or thirty minute) stopping-places. It is irrelevant to the work in hand, and therefore an obstacle to connected thinking.

After a topic covering a number of lessons has been prepared as suggested, shall the work for each day be written out in more detail as it is approached? This certainly is desirable, and it is the custom in some training schools for teachers. But since time and strength are limited, the authors are on the whole opposed to devoting much effort to these daily lesson plans. Many topics of instruction can receive little preparation, and we believe it is a better use of time to outline a greater number of topics very carefully as wholes, entering thoroughly into their spirit and conceiving clearly the main points of method involved in their presentation, than to reduce the number of such topics for the sake of greater skill in minor points of method. It is a question of relative values. Some of the more detailed work should, however, be done by every young teacher; every experienced teacher that is fully alive naturally drops into the habit of adapting her work each day to her pupils and seizes many odd moments for planning such adaptation. It is only the careful writing out of the particular day's lesson that seems to us to involve some loss, when compared with the gain brought about by the careful consideration of large topics.